154

NO. 154

CONTENTS

TRADE NAME AND MODEL	SET AND FOLDER NO.
ARVIN	
551T (Ch. RE-297)	154-2
DAVID BOGEN	
HE-10	154-3
FIRESTONE	
4-A-92	154-4
GENERAL ELECTRIC	
422, 423	154-5
HALLICRAFTERS Tel. Rec.	
20990, 20990S	154-6
20994	154-6
MASCO	
ME-36, ME-36R	154-7
MITCHELL Tel. Rec.	
T16-B, -M, T16-2KB, T16-2KM, T17-B, -M	154-8
OLYMPIC	
489	154-9
PHILCO Tel. Rec.	
50-T1104 (Code 123) Prod. Chge. Bul. 29	154-1
50-T1400 (Code 121 & 122), 50-T1401 (Code 121), 50-T1402 (Code 121 & 122), 50-T1403 (Code 121 & 122), 50-T1404 (Code 121 & 122) Prod. Chge. Bul. 29	154-1
50-T1406 (Code 121 & 122) Prod. Chge. Bul. 29	154-1
50-T1430 (Code 121) Prod. Chge. Bul. 29	154-1
50-T1432 (Code 122) Prod. Chge. Bul. 29	154-1
PHILCO	
52-540, 52-540I, 52-541, 52-541I, 52-542I	154-10
SCOTT	
310	154-11
SYLVANIA Tel. Rec.	
22M-1, 23B, M, M-1 (Ch. 1-387-1)	154-12
24M (Ch. 1-462-1)	154-12
24M-1, M-3 (Ch. 1-387-1)	154-12
TRUETONE Tel. Rec.	
2D1185B	154-13
WESTINGHOUSE	
H350T7, H351T7 (Ch. V-2180-1)	154-14
WESTINGHOUSE Tel. Rec.	
H648T20 (Ch. V-2201-1)	154-15
H649T17, H650T17, H651K17 (Ch. V-2200-1)	154-15
H652K20 (Ch. V-2201-1)	154-15
H655K17, H656K17, H657K17 (Ch. V-2200-1)	154-15
H659T17 (Ch. V-2204-1)	154-15
H662K20 (Ch. V-2201-1)	154-15
H663T17 (Ch. V-2204-1)	154-15
H664K17 (Ch. V-2200-1)	154-15

The PHOTOFACT Servicer

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"The better the start, the better the end." - Anon.

TRADE NEWS

Radio Fall Meeting Held in Toronto, Canada

The annual I. R. E. fall meeting was held this year in Toronto, and during the three-day session, many interesting papers were presented outlining developments of both civilian and military equipment. One of the outstanding sessions presented papers having to do with color television. The papers presented were in effect reports of the various panels which have been set up under the National Television Systems group.

Reports and demonstrations were made, based upon the findings of this group, and it is the expressed desire of the various panel members to continue their activities to a logical conclusion. At the present time the joint system seems to have the most promise of any of the color TV systems proposed, and it was felt that the field tests and final preparation of the report should be carried on to the point where a compatible system will be available to the industry once the defense mobilization permits the manufacture of color television transmitters and receivers. Because of the rapid progress of these panels, and the fact that the goal seems to be in sight, it was felt that the necessary man power to complete the job would not interfere with the defense mobilization picture.

Other sessions of the fall meeting included papers on "Noise Immunity in Television Receivers", "Suppression of Local Oscillator Radiation in Television Receivers", a symposium on tube reliability and standardization, and several papers on the subject of U. H. F. television converters.

It is the general consensus of opinion that U. H. F. will not present any undue problems to the manufacturer of home receivers or to the service technician.

* * *

New 21-inch Picture Tubes Announced by DuMont

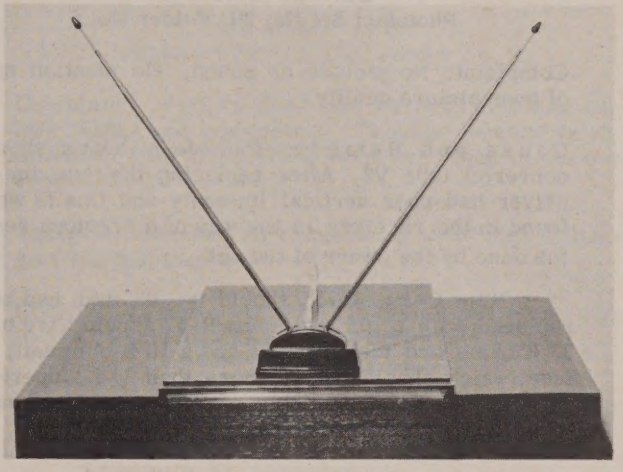
Two new all-glass 21-inch rectangular TV picture tubes are now available from the Allen B. DuMont Laboratories, Inc. These tubes, designated as types 21EP4A and 21KP4A, employ the same all-glass bulb and have a picture area of 242 square inches. The screen face is made of filter glass for minimizing reflections and improving contrast.

Type 21EP4A employs electro magnetic focusing, and a single magnet ion trap is used. Type 21KP4A is one of the recently developed self-focus units requiring no focus controls or associate circuitry. Both types are now available for delivery to the trade.

JFD Adds Two Items to Antenna Accessory Line

The first, an "open line" lightning arrestor, called Model AT107, has been developed to assure protection for set owners who have long open wire transmission lines. Of rugged construction, it is permanently sealed against temperature and humidity changes.

The second is open wire transmission line, designated as "Super-Gain." Manufactured of copper wire, with a steel core, and insulated by low-loss polystyrene spacers, it is said to have 1/6 the decibel loss of regular 300 ohm lead-in, and for this reason will prove beneficial for use in fringe and remote areas. Both of these items are now available to the trade.



Insuline Corporation of America Markets New Indoor Antenna

A new unit called the "Meteor" and carrying Catalog No. 6470, is pictured. This unit, of simple design, incorporates two arms which are adjustable in length, and hinged so that they may be operated in any position. A weighted base permits the antenna to be oriented quickly and minimizes the possibility of shifting in use. A length of 300 ohm lead is supplied, and attachment to a television receiver can be made quickly.

* * *

NEW PUBLICATION

The Richardson Co. "Facts About Plastics"

With the ever-increasing use of plastics in the electronics field, this interesting brochure will ans-

wer many questions about their applications. The subjects covered include the history of plastics as well as an explanation of how various plastic materials are made and their comparative properties.

Copies of "Facts About Plastics" can be obtained by writing on your company letterhead to:

The Richardson Company
2764 Lake Street
Melrose Park, Illinois

* * *

FIELD EXPERIENCES

For every "Field Experience" published, we issue a certificate good for one PHOTOFACT Folder Set. Awards are issued at the time of publication. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Co., Inc.

Typical of the added headaches a TV service technician encounters, is this service hint:

BENDIX Model 6002
Photofact Set No. 99, Folder No. 5

Complaint: No picture or sound. No mention made of poor picture quality.

Cause and Remedy: Cathode-to-heater short in converter tube V2. After replacing the tube, the receiver had poor vertical linearity and this is what I found in the receiver in the way of a previous repair job done by the owner of the set:

Item C-39, which should be .03 mfd. had been replaced with a .05 mfd. unit; R-52 should have been 33 K ohms and the receiver had a 10 K ohm unit; the fuse, which should be not more than 1/4 ampere in value, was 4 amp. All the connections had been made with liquid solder - and what a mess it was!

After replacing all the units and resoldering the poor joints, the receiver operated normally.

MUNTZ Model M41
Photofact Set No. 116, Folder No. 10

Complaint: No picture. Sound okay.

Cause: Item C62 shorted to chassis, burning up Item R74.

Remedy: Replacement with the recommended units cleared the trouble.

Editor's Note: Both above Experiences were contributed by:

J. W. Smith
The Radio Shack
1602 W. Pratt Street
Baltimore, Maryland

PHILCO Model 50-T-1404
Photofact Set No. 155, Folder No. 8

Complaint: Motorboating in audio, with volume control in any position. Moving the vertical linearity control changed the frequency of the feedback.

Cause and Remedy: Capacitor C-3D had opened. Replace this capacitor with a 50 mfd. 50 volt unit.

WESTINGHOUSE Model H626-T-16
Photofact Set No. 116, Folder No. 13

Symptom: No horizontal synchronization. Horizontal frequency so far off that it produces two over-lapped images. After checking the various components, I discovered that R-91 had increased in value by three times.

Remedy: Replace R-91 with the recommended unit.

Editor's Note: Both above Experiences were contributed by:

Horace D. Westbrooks
415 West Slaton Avenue
Griffin, Georgia

* * *

PHILCO Model 51-1733
Photofact Set No. 137, Folder No. 9

Complaint: Extremely high hum level.

Analysis and Repair: I first checked the filter capacitors and found them to be okay. A further examination with the voltmeter showed that there was no voltage on the screen of V1. Capacitor C6 had shorted and burned out Item R5.

After replacing these units the loud hum was stopped, but a loud popping noise occurred at about one second intervals.

I then discovered that capacitor C9 had about a 50 megohm leak and the replacement of this unit and a realignment of the RF circuits effected the repair.

Colosia Radio Hospital
738 McCallie Avenue
Chattanooga 3, Tennessee

* * *

RCA Model RC-168
Photofact Set No. 72, Folder No. 10

Complaint: Failed to change automatically, but would reject.

Trouble and Remedy: The needle pressure was only three grams and the needle jumped out of the groove when the arm engaged the reject dog. I added enough weight to bring the needle pressure to 6-1/2 grams and the changer worked perfectly.

H. D. Vorhauer
Triangle Radio Service
837 South Main
Chincoteague, Virginia

GE Model 10T1
Photofact Set No. 96, Folder No. 4

Complaint: No Picture, no sound. Tube filaments lighted.

Analysis and Repair: Voltage check indicated no B+ off the selenium rectifiers. A full check indicated that R115 was open. Replacement of this resistor, with one of the recommended units repaired the receiver.

TELEKING Model 114
Photofact Set No. 141, Folder No. 13

Complaint: No raster. No high voltage.

Analysis and Repair: Item M1 (fuse) blown. Pin No. 3 of tube V18 shows short to ground. Capacitor C82 shorted. Replacement of this capacitor and the fuse repaired the receiver.

MOTOROLA Model 12VT13R
Chassis TS-23A
Photofact Set No. 92, Folder No. 4

Complaint: After approximately fifteen minutes operation the set would begin to lose picture height.

Trouble: Small diameter coaxial cable - vertical integrator to vertical oscillator grid - intermittently shorting between center conductor and shield.

Remedy: Replace cable.

Editor's Comment: This failure could cause the loss of valuable time since it is characteristic of component failure in the vertical circuit and normally this particular cable would not be suspected.

Note: All three above Experiences were contributed by:

Field Service Section
Howard W. Sams & Co., Inc.

* * *

GE 14-inch, 16-inch, and 17-inch Series
Photofact Set No. 123, Folder No. 4

Complaint: Poor sync accompanied by excessive contrast.

Cause and Remedy: We have found that capacitor C77 becomes leaky or shorted, and any leakage here is sufficient reason to replace this capacitor with one of the recommended units.

Another complaint on this same series of receivers is the leaky local oscillator voltage. Whenever this isn't the fault of the defective 12AT7 we find it advisable to replace Item C21 in the tuner. This unit, and its accompanying 10 K ohm, 1/2 watt resistor, should be replaced as an assembly. After replacement it may be necessary to touch up the oscillator adjustments to center the fine tuning range.

Louis Wojtalik
Visual Electronics Company
8504 Mack Avenue
Detroit, Michigan

MOTOROLA Model 19K2
Photofact Set No. 122, Folder No. 5

Complaint: No high voltage.

Cause: Leaky capacitor, Item C70, in cathode circuit of 6AL5, horizontal phase detector.

Remedy: Replace Item C70, which is located behind the bakelite plate of the horizontal output transformer.

RCA Model 4T-101
Photofact Set No. 139, Folder No. 12

Complaint: Intermittent sound and picture.

Cause: Leaky capacitor C12 in RF amplifier section. The B+ was found to vary on the screen of the 6CB6 - between 24 and 115 volts.

Remedy: Replace Item C12.

Editor's Note: Both above Experiences were submitted by:

F. Loewy
Ace Radio-Television Service
19 South Third Street
Phoenix, Arizona

* * *

GE Model 14C102
Photofact Set No. 123, Folder No. 4

Complaint: Picture goes into vertical line and finally blanks out completely. Trouble appears intermittently with the picture coming back of its own accord.

Analysis: Checked all components and high voltage sections and they were okay.

Remedy: Intermittent 1 megohm resistor, Item R-111. Replacement repaired the receiver.

H. W. Feelth
Sappington Television
Gravois Road East of Lindbert
Sappington 23, Missouri

* * *

EMERSON Model 663-B
Chassis 120127B, 120128B
Photofact Set No. 125, Folder No. 6
Production Change Bulletin
Photofact Set No. 130, Folder No. 1

Complaint: Raster but no picture. Sound very weak or none at all.

Cause and Remedy: Capacitor C6 in tuner section shorted. Replaced this capacitor and resistor R11 with recommended units and the set worked okay.

A. J. Cipriani
Community Hardware
9th & Charles
Wellsburg, W. Virginia

ANNOUNCING TWO NEW MAJOR SERVICES IN PHOTOFACTS

1. You have already seen the incorporation of voltage values on standard notation schematics at the tube pins. This enables you to speed up your service work.

2. You soon will see reproductions of actual waveforms taken at representative points in television receivers. Photographs are taken directly from the oscilloscope, and peak-to-peak voltages are calibrated on all television receivers covered by PHOTOFACT Folders.

This additional service will not only enable you to get the utmost from your test equipment, but it provides you with the positive assurance that you are rendering the highest type of service possible.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 114	
	Philco Models 50-T1104 Code 123, 50-T1400, 50-T1401, 50-T1402 and 50-T1430 Code 121 were covered in Photofact Folder 9 in Set 114. Three more models were added to this group, and they are electrically identical to Model 50-T1400. The added models are 50-T1403, 50-T1404 and 50-T1406 CODE 121.
MODELS 50-T1400, 50-T1401, 50-T1402, 50-T1403, 50-T1404, 50-T1406, 50-T1430. (ALL CODE 121) Run 1 thru Run 10.	Production changes Run 1 thru Run 10 were covered in Photofact Folder 9 in SET 114
Run W	TO EXTEND RANGE OF HORIZONTAL OSCILLATOR TANK CIRCUIT. The letter "W" stamped after the run number indicates that R111 was changed to 68KΩ.
Run V	TO EXTEND RANGE OF HORIZONTAL OSCILLATOR TANK CIRCUIT. The letter "V" stamped after the run number indicates that R111 was changed to 82KΩ and that an 860KΩ resistor is shunted across it.
Run 11	TO REDUCE MICROPHONICS The tuner unit was shock mounted.
Run 11	TO INCREASE TUNER B+ VOLTAGE R122 was changed to 5100Ω.
Run 12	TO IMPROVE INTERLACE AND REDUCE JITTERS. C80 was changed to 12 MMF.
Run 13	TO REDUCE PICTURE WEAVE Power transformer T1 was changed to a unit having a hum shield. The new part number for T1 is 32-8423-2.
Run 14	TO CENTER RANGE OF HORIZONTAL OSCILLATOR COIL SLUG. C97 was changed to 220 MMF.
Run 15	TO INCREASE WIDTH L40 was changed to part number 32-4419-3.
Run 16	TO PREVENT SHORTED COMPONENTS DUE TO INTERNAL PIN CONNECTIONS OF SOME 1B3GT TUBES. The 1B3GT socket and wiring was changed. The wiring was removed from pin 5 of the socket and placed on pin 4.
Run 17	TO REDUCE HARMONIC BEAT The physical location of the sound detector components was changed.
Run 18	COMPONENT CHANGE R52 was changed to 1800Ω. R54 removed.
Run 19	CHANGE OF VERTICAL OUTPUT TRANSFORMER The vertical output transformer T4, was changed to a smaller size part number 32-8405.
Run 20	TO PROVIDE PROTECTION AGAINST FILAMENT SHORTS A fuse (length of # 26 copper wire) was added in series with the ground lead of filament winding of power transformer.
Run 21	TO REDUCE PARASITIC OSCILLATION IN 6BQ6G TUBE. A 820 MMF. capacitor was added to screen of horizontal output tube.
Run 22	TO PROVIDE ADDITIONAL PROTECTION The B supply fuse was changed to ½ amp. delayed action type and wired in series with the B lead of the power transformer.
	PHILCO MODELS 50-T1400, 50-T1402, 50-T1403, 50-T1404, 50-T1406, 50-T1432, ALL CODE 122. Philco Models 50-T1400, 50-T1402, 50-T1403, 50-T1404, 50-T1406, 50-T1432, all code 122 are electrically identical to Model 50-T1400 code 121 Run 13 except for the following minor circuit changes. The tuner was changed to a Philco 12 position turret tuner part number 76-5411-3. (For information on this tuner see Philco Model 50-T1476 Folder 11 in Set 128). The B+ line from the tuner is connected through a 10KΩ resistor instead of the series network of R120, R121 and R122. C9 is connected between ground and the junction of the tuner B+ lead and the added 10KΩ resistor. An RF choke part number 32-4112-11 was added in series with the filament lead to the tuner. Model 50-T1432 Code 122 uses a 10" speaker part number 36-1610-6.

PHILCO MODELS 50-T1104 Code 123, 50-T1400 Code 121 & 122, 50-T1401 Code 121, 50-T1402 Code 121 & 122, 50-T1403 Code 121 & 122, 50-T1404 Code 121 & 122, 50-T1406 Code 121 & 122, 50-T1430 Code 121, 50-T1432 Code 122.

CONTINUED ON REVERSE SIDE

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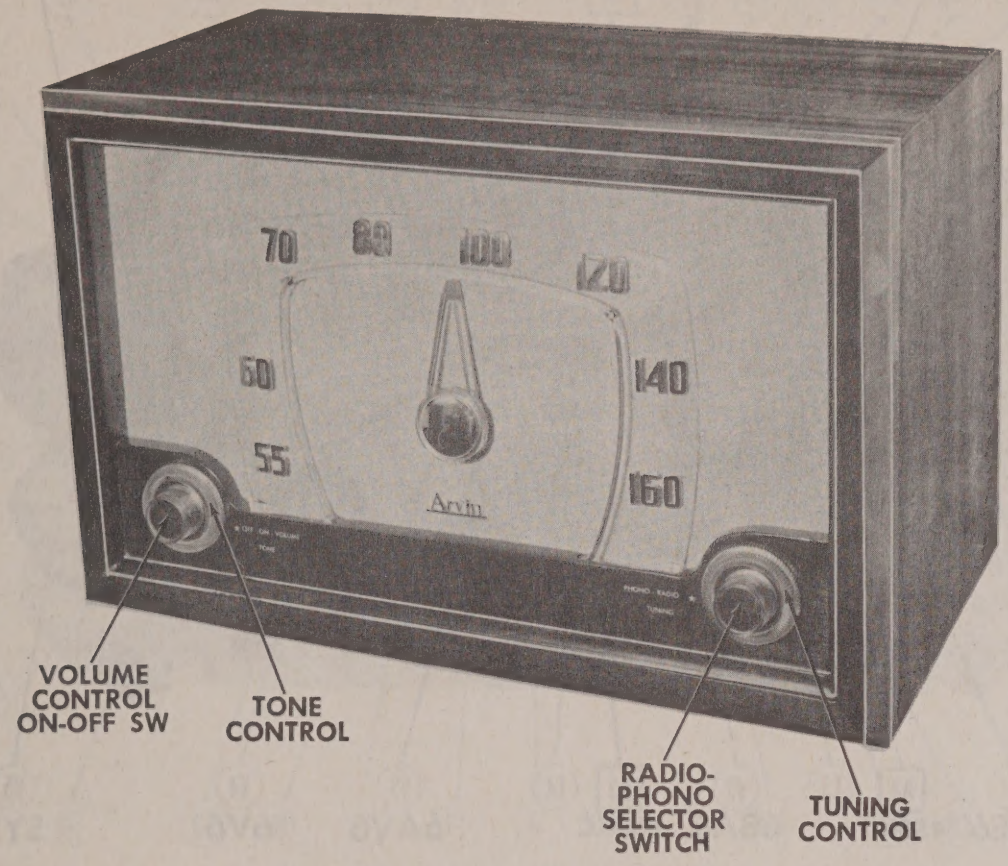
	The following production changes apply to Philco Models 50-T1400, 50-T1402, 50-T1403, 50-T1404, 50-T1406, all code 122.
MODELS 50-T1400, 50-T1402, 50-T1403, 50-T1404, 50-T1406, ALL CODE 122. Run 2	TO PREVENT SHORTED COMPONENTS DUE TO INTERNAL PIN CONNECTIONS OF 1B3GT TUBES. The 1B3GT socket and wiring was changed. The wiring was removed from pin 5 of the socket and placed on pin 4.
Run 3	COMPONENT CHANGES R52 was changed to 1800Ω. R54 removed.
Run 4	CHANGE OF VERTICAL OUTPUT TRANSFORMER The vertical output transformer, T4, was changed to a smaller size, part number 32-8405.
Run 5	TO PROVIDE PROTECTION AGAINST FILAMENT SHORTS A fuse (length of # 26 copper wire) was added in series with the ground lead of the filament winding of power transformer.
Run 6	TO REDUCE PARASITIC OSCILLATION IN 6BG6G TUBE. A 820 MMF. capacitor was added to the screen of the horizontal output tube 6BG6G.
Model 50-T1432 Code 122 Run 6	PHILCO MODEL 50-T1432 CODE 122. TO PROVIDE PROTECTION AGAINST FILAMENT SHORTS A fuse (length of # 26 copper wire) was added in series with the ground lead of the filament winding of the power transformer.

ARVIN
MODEL 551T (Ch. RE-297)



ARVIN
MODEL 551T (Ch. RE-297)

TRADE NAME	Arvin, Model 551T (Ch. RE-297)
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana
TYPE SET	AC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 6BE6 Converter, 6BA6 IF Amp., 6AV6 Det. - AVC - AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC — RATINGS .6 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD.	High side to stator on rear section of tuning gang. Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully closed.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1650KC	Tuning gang fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. put.
3.		"	1400KC	Tune for max. output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Replace set in cabinet and set pointer to 1400 on dial scale.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

ARVIN MODEL 551T

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ARVIN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	Converter	6BE6	6BE6	7CH	
V2	IF Amplifier	6BA6	6BA6	7BK	
V3	Det.-AVC-AF	6AV6	6AV6	7BT	
V4	Power Output	6V6GT	6V6GT	7AC	
V5	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	20	450	C24415	PRS450/20-20		EDL22245C		TVL-3780	Filter (Red)
B	20	450		PRS450/20					Filter (Blue)
C	20	450							Decoupling (Green)
C2	10	25	A22602	PRS25/10		BR102A		TVA-1204	Power Output Cathode
C3	.05	200	C20067-503	P288-05	DF-503	PTE4S5		2TM-S5	AVC Filter
C4	.05	400	C20068-503	P488-05	DF-503	PTE4S5		4TM-S5	Osc. Anode
C5	.05	400	C20068-503	P488-05	DF-503	PTE4S5		4TM-S5	Conv. Plate Dec.
C6	.05	400	C20068-503	P488-05	DF-503	PTE4S5		4TM-S5	IF Amp. Plate Dec.
C7	.05	400	C20068-503	P488-05	DF-503	PTE4S5		4TM-S5	IF Amp. Screen
C8	100	500	C20065-101	1468-0001	D6-101	5W5T1	GP1K-101	1FM-31	Diode RF Filter
C9	100	500	C20065-101	1468-0001	D6-101	5W5T1	GP1K-101	1FM-31	Diode RF Filter
C10	.005	200	C20067-502	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Tone Comp.
C11	.01	400	C20068-103	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Audio Coupling
C12	250	500	C20065-251	1468-00025	D6-251	5W5T25	GP2K-251	1FM-325	AF Amp. Plate
C13	.005	200	C20067-502	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Tone Comp.
C14	.01	600	D20358-103	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Audio Coupling
C15	.005	400	C20069-302	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Power Output Plate
C16	.01	600	D20358-103	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Line Filter
C17	.01	600	D20358-103	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Line Filter

CONTROLS

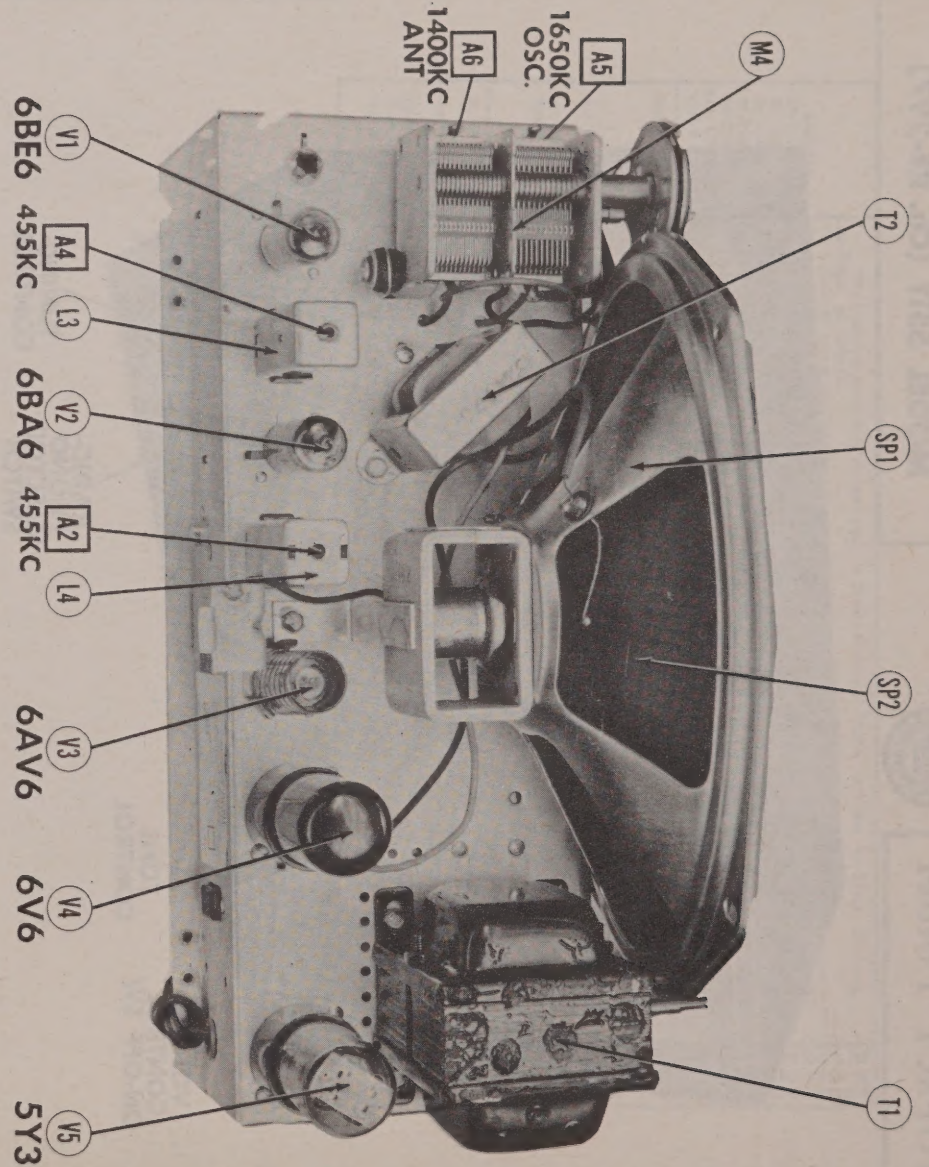
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	C24535	Concentrikit B11-133 †	RTV-295		Tone Control - Panel
B	500KΩ	½		B13-133X †			Volume control and Switch - Rear-Tapped at 100K
C	Shaft end			E-187 †			Attach per instructions in concentrikit
D	Switch			76-1 †			Attach per instructions in concentrikit

† Additional parts to be used with concentrikit

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ARVIN PART No.	IRC PART No.	IDENTIFICATION CODES
R2	3300Ω	½	C20060-332	BTS-3300	Mixer Plate Decoupling
R3	22KΩ	½	C20060-223	BTS-22K	Osc. Grid
R4	22KΩ	2	C20302-223	BTB-22K	Osc. Anode
R5	2.2Meg	½	C20060-225	BTS-2.2Meg	AVC Network
R6	68Ω	½	C20060-680		IF Amp. Cathode
R7	47KΩ	1	C20070-473	BTA-47K	IF Amp. Screen
R8	47KΩ	½	C20060-473	BTS-47K	Diode RF Filter
R9	47KΩ	½	C20060-473	BTS-47K	Tone Compensation
R10	6.8Meg	½	C20060-685	BTS-6.8Meg	AF Amp. Grid
R11	470KΩ	½	C20060-474	BTS-470K	AF Amp. Plate
R12	470KΩ	½	C20060-474	BTS-470K	Output Grid
R13	270Ω	1	A24891	BW-1-270	Output Cathode - Wire wound
R14	820Ω	1	C20070-821	BTA-820	Decoupling
R15	750Ω	5	C23970-14	1 3/4A-750	Filter
R16	2Ω	½	A24761		Series dial light

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ARVIN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .6A	600VCT .070ADC	5VAC @ 2A	6.3JAC @ 2A	D24440			PV-70A ①

① Drill New Mounting Holes

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ARVIN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	5KΩ	4Ω	420Ω	.6Ω	C-34776-2	A-3877①	A-3019	RO-9①	① Drill one new mounting hole

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
SP1	FIELD	V.C. IMP.	D24402	ST810 Mod. P6SV	69A2	
	PM	4Ω				
	CONE DIA.	V.C. DIA.				
SP2	6"X 9"	9/16"				

R F COILS

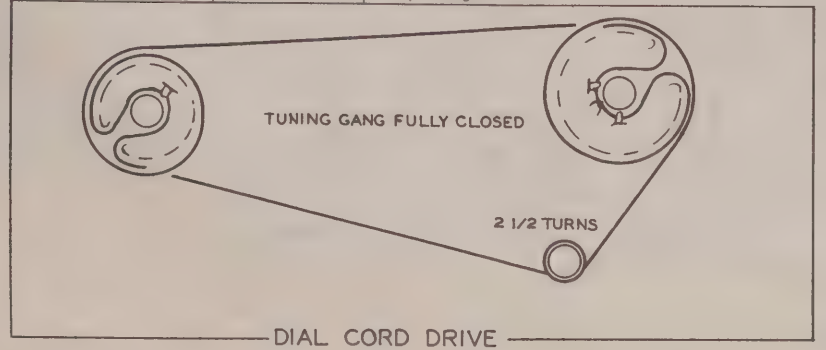
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	ARVIN PART No.	
L1	Loop Ant.	.1Ω	1.4Ω	D24777	
L2	Osc. Coil	.6Ω	7Ω	AC24482-1	
L3	Input IF	23Ω	22Ω	C21797-16	
L4	Output IF	12Ω	12Ω	C21797-19	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					ARVIN PART No.		
M1	Bayonet	6-8	.15	Brown	A-19351		Type number 47.
M2	Bayonet	6-8	.15	Brown	A-19351		Type number 47.

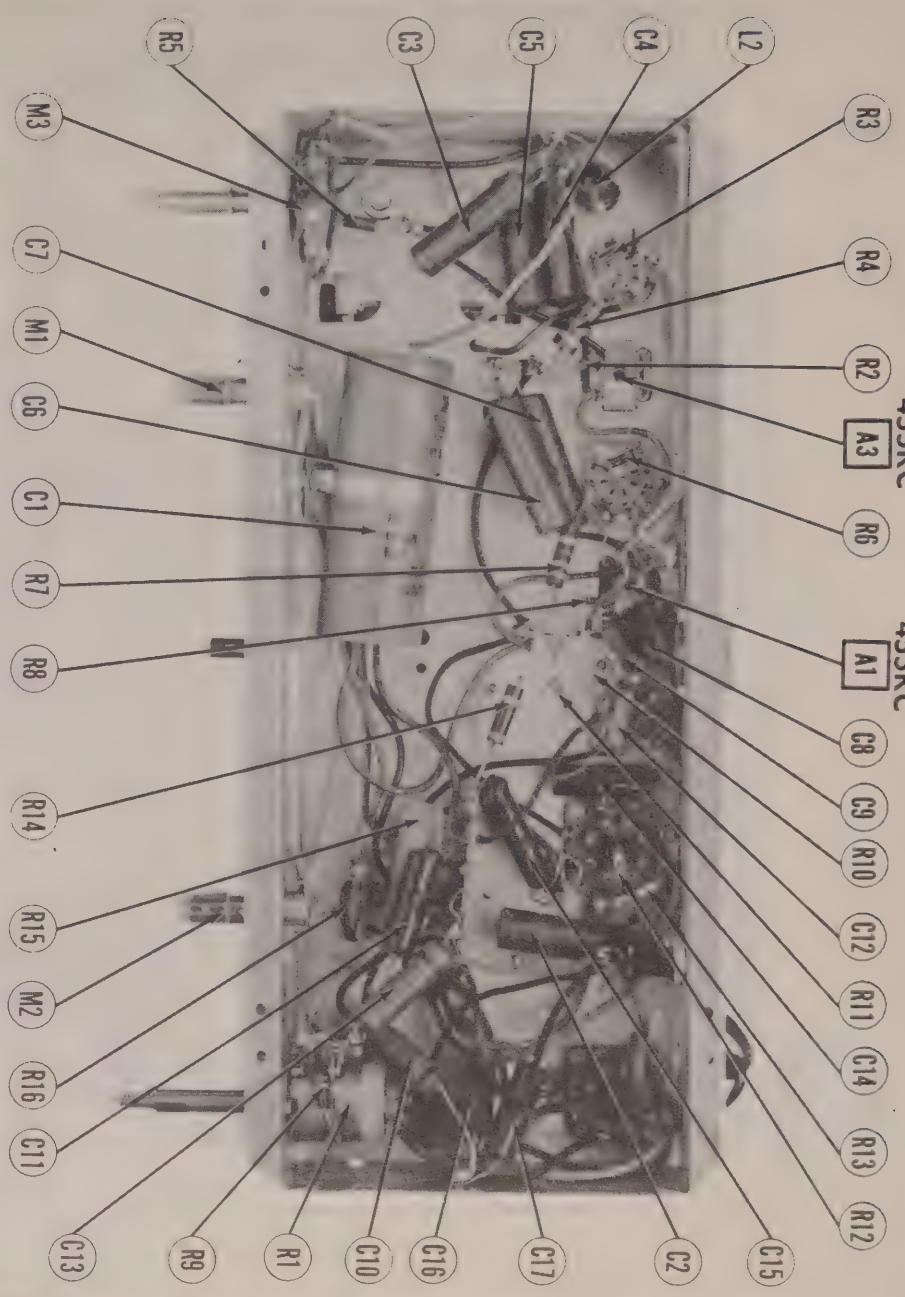
MISCELLANEOUS

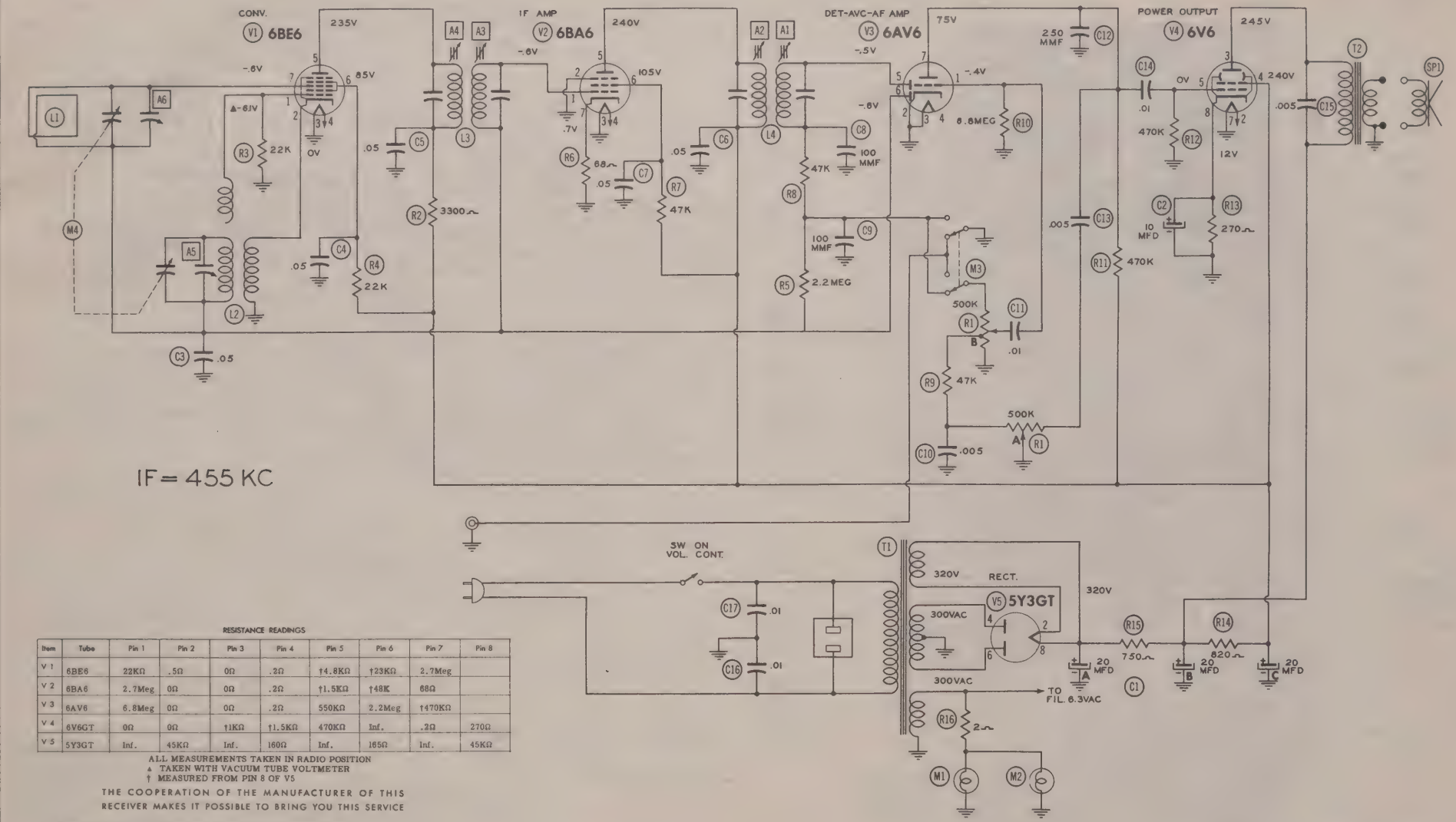
ITEM No.	PART NAME	ARVIN PART No.	NOTES
M3	Switch	C24438	Radio - Phono
M4	Tuning Cap	C24305	(18-500MMF, 19-220MMF)
	Pointer	AC24475-1	Includes shaft and bracket assembly
	Phono Jack	A19552	
	Knob	A24442-1	Volume, Radio - Phono
	Knob	A24443-1	Tone, Tuning



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BE6	22KΩ	.5Ω	0Ω	.2Ω	†4.8KΩ	†23KΩ	2.7Meg	
V 2	6BA6	2.7Meg	0Ω	0Ω	.2Ω	†1.5KΩ	†48K	68Ω	
V 3	6AV6	6.8Meg	0Ω	0Ω	.2Ω	550KΩ	2.2Meg	†470KΩ	
V 4	6V6GT	0Ω	0Ω	†1KΩ	†1.5KΩ	470KΩ	Inf.	.2Ω	270Ω
V 5	5Y3GT	Inf.	45KΩ	Inf.	160Ω	Inf.	165Ω	Inf.	45KΩ

ALL MEASUREMENTS TAKEN IN RADIO POSITION
▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 8 OF V5

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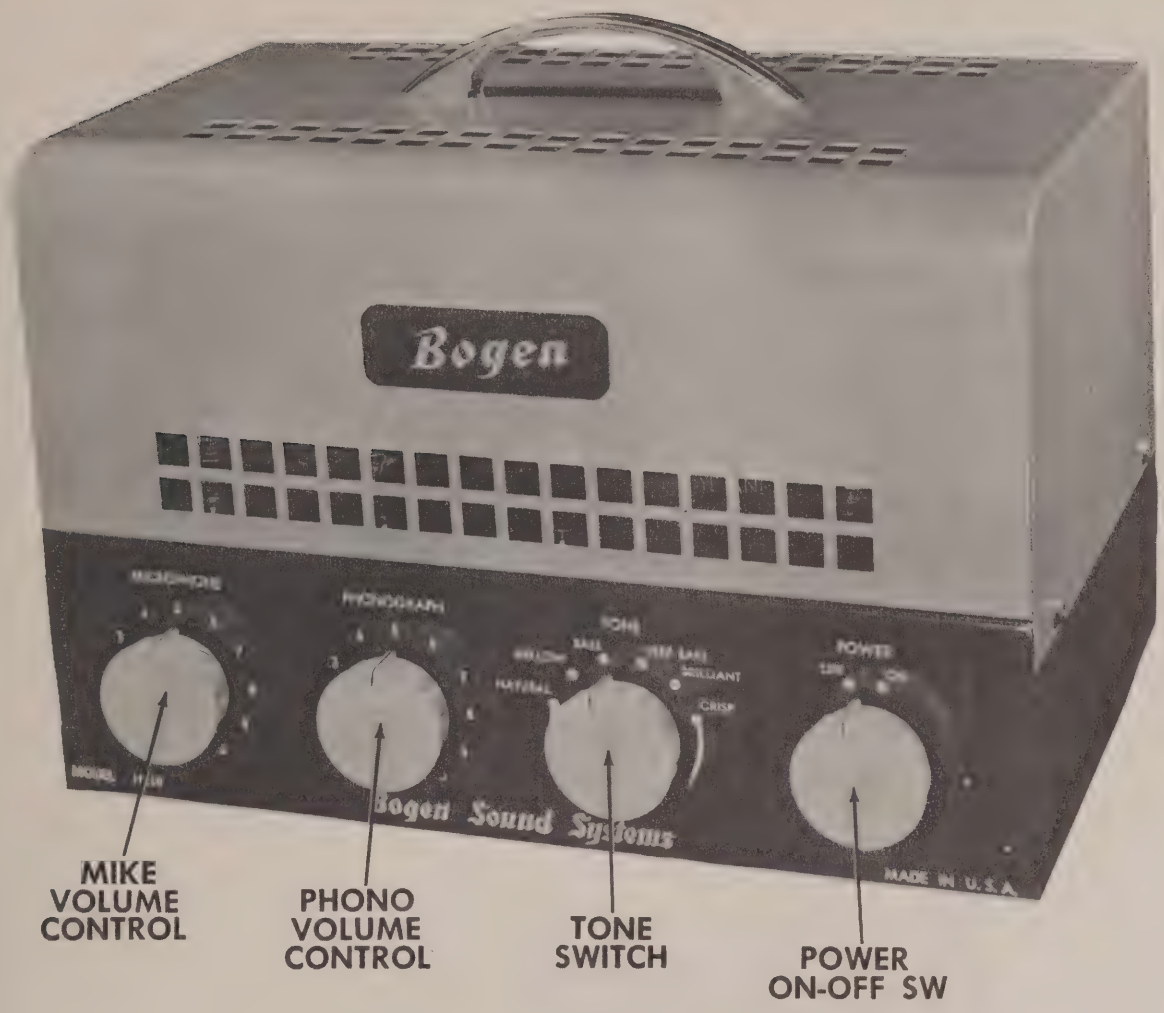
154-2

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DAVID BOGEN
MODEL HE-10



DAVID BOGEN
MODEL HE-10

TRADE NAME	David Bogen, Model HE-10	
MANUFACTURER	David Bogen Co., Inc., 663 Broadway, New York 12, New York.	
TYPE SET	AC Operated 2 Channel Audio Amplifier	
TUBES (FIVE)	Types 6SJ7 Mic. Pre-Amp., 6SL7 AF Amp. - Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rectifier.	
POWER SUPPLY	110-120 Volts AC	RATINGS .60 Amp. at 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
MODEL HE-10

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DAVID BOGEN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	Mic. Pre-Amp.	6SJ7	6SJ7	8N	
V2	AF Amplifier–Phase Inverter	6SL7	6SL7	8BD	
V3	Power Output	6V6GT	6V6GT	7AC	
V4	Power Output	6V6GT	6V6GT	7AC	
V5	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DAVID BOGEN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	10	450		AFH-2-47		UP5Q45		TVL-2750	▲ Filter
B	10	450							● Filter
C2A	5	450		AFH 4-09		UP5Q45		TVL-4760	● Power Output Screen
B	5	450							■ Power Output Screen
C	5	450							▲ Mic. Pre Amp. Dec.
D	5	450							AF Amp. Decoupling
C3	10	25		PRS25/10		BR102A		TVA-1204	AF Amp. Cathode
C4	50	50		PRS50/50		BR505		TVA-1308	Power Output Cathode
C5	.03	400		P488-03		PTE6S3		6TM-S3	Audio Coupling
C6	.05	400		P488-05	DF-503	PTE4S5		4TM-S5	Mic. Pre Amp. Screen
C7	.03	400		P488-03		PTE6S3		6TM-S3	Audio Coupling
C8	.001	600		P688-001	D6-102	PTE6D1	GP2L-102	6TM-D1	Tone Comp.
C9	.003	600		P688-003	D6-302	PTE6D3	GP2-333-302	6TM-D3	Tone Comp.
C10	250	500		1468-00025	D6-251	5W5T25	GP2K-251	1FM-325	Tone Comp.
C11	.006	600		P688-006		PTE6D3	GP2-333-602	6TM-D3	Tone Comp.
C12	.006	600		P688-006		PTE6D3	GP2-333-602	6TM-D3	Tone Comp.
C13	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Tone Comp.
C14	.05	400		P488-05	DF-503	PTE4S5		4TM-S5	Audio Coupling
C15	50	500		1468-00005	D6-500	5W5Q5	GP1K-500	1FM-45	Audio Coupling
C16	.05	400		P488-05	DF-503	PTE4S5		4TM-S5	Audio Coupling
C17	.02	400		P488-02	DF-203	PTE4S2		4TM-S2	Tone Comp.
C18	.006	600		P688-006		PTE6D6	GP2-333-602	6TM-D6	Tone Comp.
C19	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Line Filter

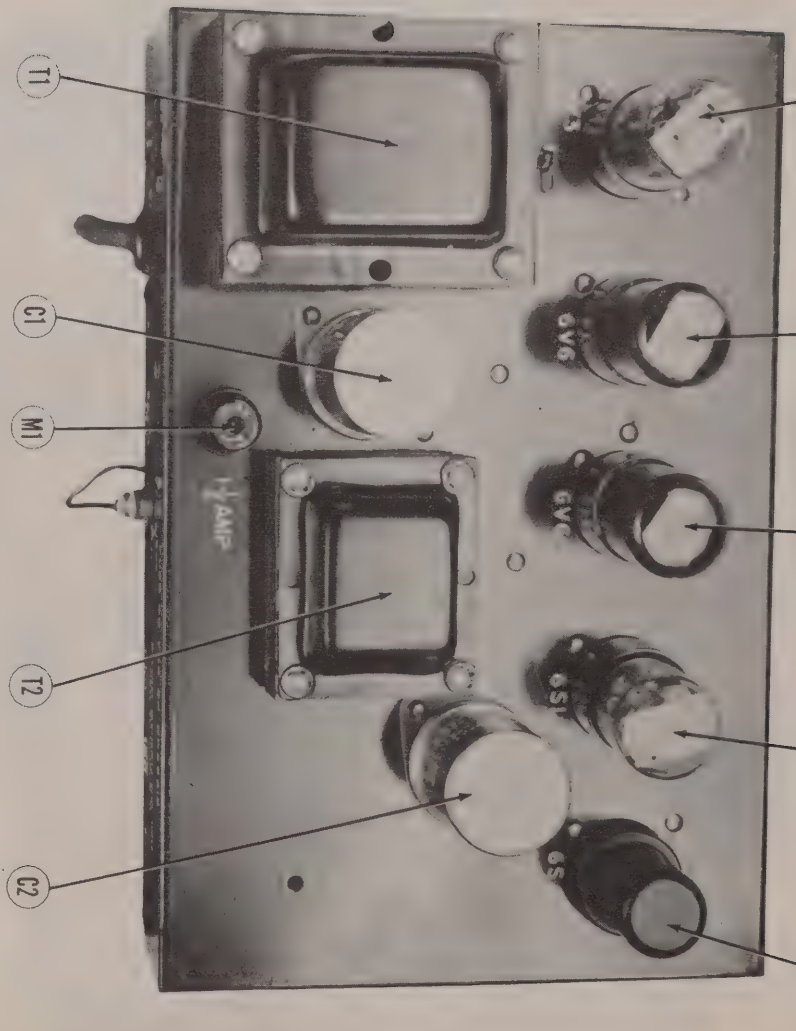
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: David Bogen PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	V-202-B	Q13-133	AG-60-Z	B-60	Mike Volume Control
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Attach to R1A per instructions
R2A	500KΩ	½	V-202-B	Q13-133	AG-60-Z	B-60	Phono Volume Control
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Attach to R2A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DAVID BOGEN PART No.	IRC PART No.	IDENTIFICATION CODES
R3	4.7Meg	½		BTS-4.7Meg	Mike Pre Amp. Grid
R4	2.2Meg	½		BTS-2.2Meg	Mike Pre Amp. Screen
R5	470KΩ	½		BTS-470K	Mike Pre Amp. Plate
R6	220KΩ	½		BTS-220K	AF Amp. Grid - See Note 1
R7	220KΩ	½		BTS-220K	AF Amp. Grid - See Note 1
R8	470Ω	½		BTS-470	AF Amp. Cathode
R9	3300Ω	½		BTS-3300	AF Amp. Cathode
R10	22KΩ	½		BTS-22K	Phase Inverter Grid
R11	3900Ω	½		BTS-3900	Phase Inverter Cathode
R12	270KΩ	½		BTS-270K	Phase Inverter Plate - See Note 2
R13	270KΩ	½		BTS-270K	AF Amp. Plate - See Note 2
R14	470KΩ	½		BTS-470K	Output Grid
R15	33Ω	½			Output Cathode
R16	470KΩ	½		BTS-470K	Output Grid
R17	33Ω	½			Output Cathode
R18	270Ω	2		BW-2-270	Output Cathode
R19	2200Ω	1		BTA-2200	Feedback Network
R20	22K	½		BTS-22K	Voltage Divider

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DAVID BOGEN PART No.	IRC PART No.	
R21	47K	1/2		BTS-47K	Voltage Divider
R22	15K	1/2		BTS-15K	Tone Compensation
R23	470K	1/2		BTS-470K	Tone Compensation
R24	100KΩ	1/2		BTS-100K	Tone Compensation
R25	150KΩ	1/2		BTS-150K	Tone Compensation
R26	33KΩ	1/2		BTS-33K	Tone Compensation
R27	33KΩ	1/2		BTS-33K	Tone Compensation
R28	47KΩ	1/2		BTS-47K	Tone Compensation
R29	3300Ω	1		BTA-3300	Voltage Divider
R30	250Ω	5		1 3/4A-250	Filter
R31	47KΩ	2		BTB-47K	Bleeder

Note 1 Some Models use 270KΩ Resistor in this application
Note 2 Some Models use 220KΩ Resistor in this application

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	DAVID BOGEN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .6A	660VCT .08ADC	5.0VAC @ 2A.	6.3VAC @ 1.5A	T362-1	PM-8409②	P-2952	PH - 90①

① Drill New Mounting Holes
② Add series Resistor to reduce plate voltage

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		DAVID BOGEN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	6KΩ C.T.	500Ω Tapped @4Ω, 8Ω, 15Ω	370Ω	31Ω Tapped @ .7Ω .8Ω 1.2Ω	T260-1		A-3131①	PSO-80①	① Drill New Mounting Holes

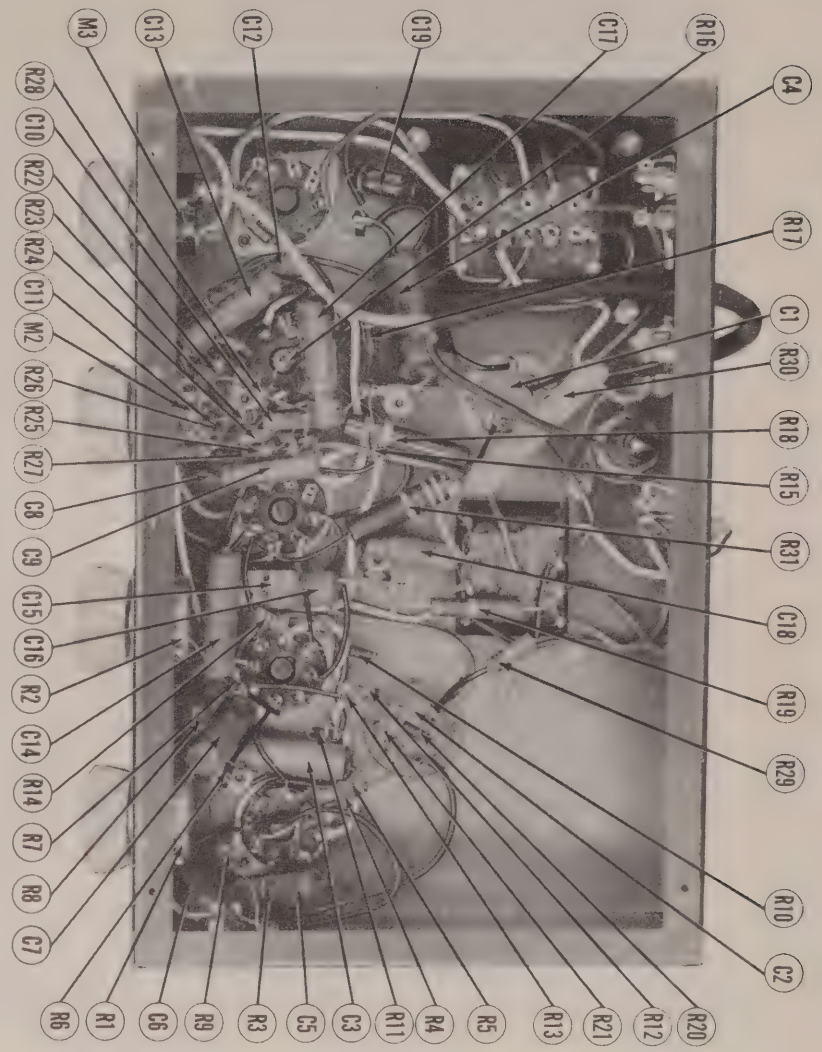
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			DAVID BOGEN PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG	1.5A			31201.5	342001	

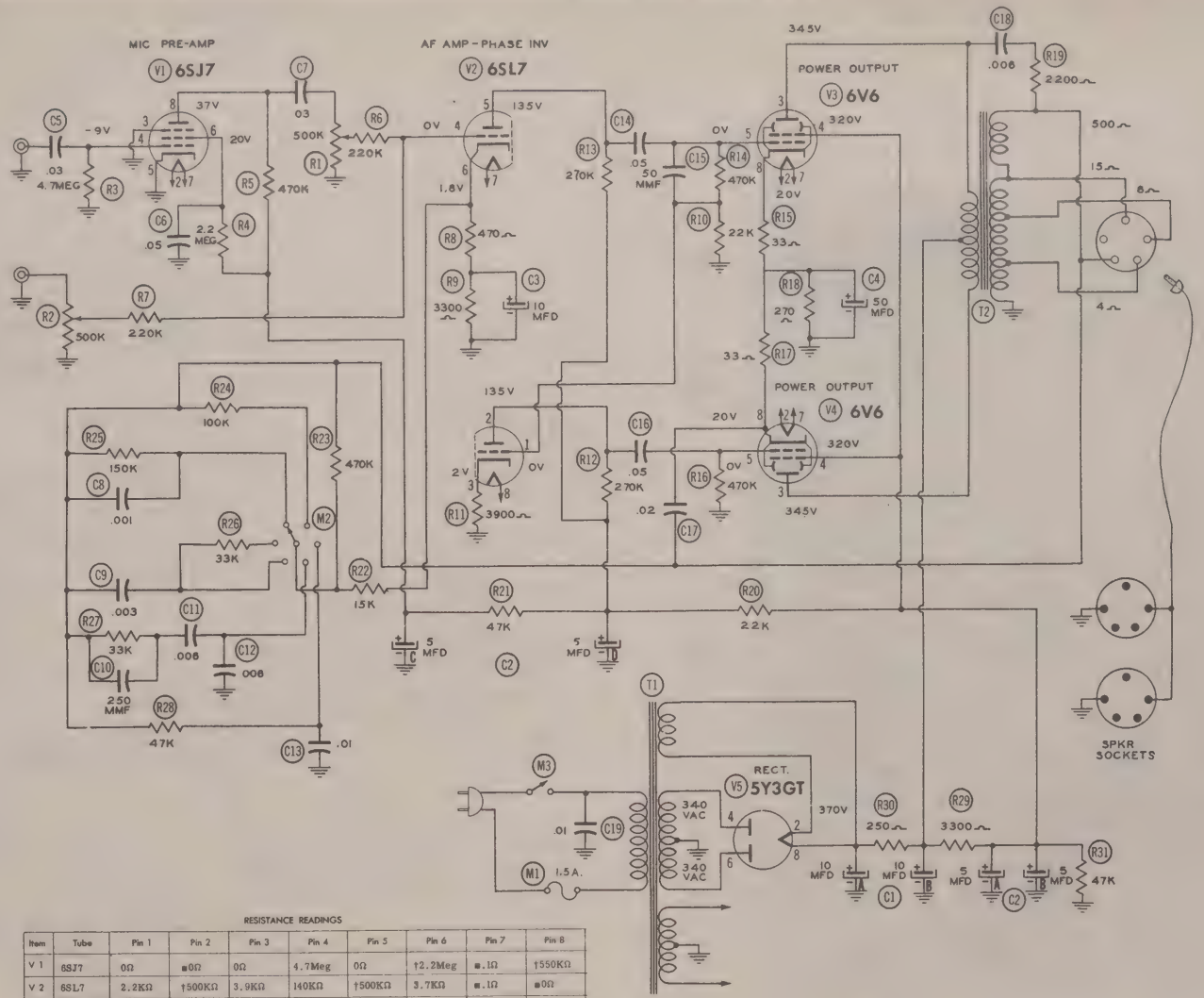
MISCELLANEOUS

ITEM No.	PART NAME	DAVID BOGEN PART No.	NOTES
M2	Switch		Tone
M3	Switch		On - Off

CHASSIS—BOTTOM VIEW



DAVID BOGEN MODEL HE-10



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SJ7	0Ω	■0Ω	0Ω	4.7Meg	0Ω	†2.2Meg	■.1Ω	†550KΩ
V 2	6SL7	2.2KΩ	†500KΩ	3.9KΩ	140KΩ	†500KΩ	3.7KΩ	■.1Ω	■0Ω
V 3	6V6GT	Inf.	■.1Ω	†620Ω	†3.5KΩ	500KΩ	470KΩ	■0Ω	300Ω
V 4	6V6GT	0Ω	■.1Ω	†620Ω	†3.5KΩ	470KΩ	3.7KΩ	■0Ω	300Ω
V 5	5Y3GT	Inf.	50KΩ	Inf.	160Ω	Inf.	170Ω	Inf.	50KΩ

M2 in "Natural" Position
† Measured from Pin 2 of V5
■ Measured from Pin 7 of V4

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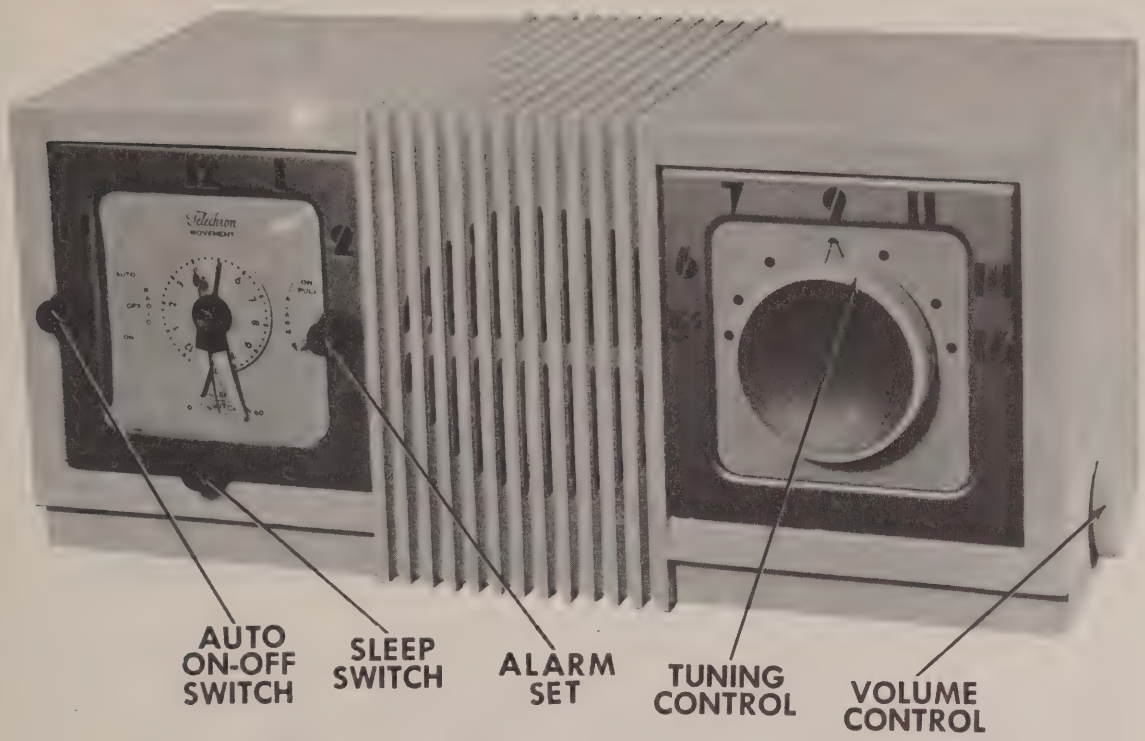
154-3

1. DC voltage measurements are at 20,000 ohms per volt; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

FIRESTONE
MODEL 4-A-92



FIRESTONE
MODEL 4-A-92

TRADE NAME	Firestone, Model 4-A-92 (Code 297-1-327)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio.
TYPE SET	AC Operated Superheterodyne Receiver with Electric Clock.
TUBES (FIVE)	Types 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC RATING .27 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High Side to stator on rear section of tuning gang. Low side to B-.	455KC, (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum ouput. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC	Tune for max. output.	"	A5	"

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PARTS LIST AND DESCRIPTIONS

FIRESTONE MODEL 4-A-92

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	INSTALLATION NOTES
		FIRESTONE PART No.	STANDARD REPLACEMENT		
V1	Converter	12SA7GT	12SA7GT	8AD	
V2	IF Amplifier	12SK7GT	12SK7GT	8N	
V3	DET-AVC-AF	12SQ7GT	12SQ7GT	8Q	
V4	Power Output	50L6GT	50L6GT	7AC	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	50	150	N-7889	PRS150/50-30		EDL-5315		TVA-2450	Filter
B	30	150							Filter
C2	.05	200	N-1345	P288-05	DF-503	PTE4S5		2TM-S5	Tuning Cap. Isolation
C3	.05	200	N-1345	P288-05	DF-503	PTE4S5		2TM-S5	AVC Filter
C4	100		N-6015	SI100	D6-100	5W5T1	GP1K	5GA-T1	Diode RF Filter
C5	100		N-7549	SI100N750	TCN-100		N750L-101	5TCU-T1	Fixed Trimmer
C6	.005	600	N-4894	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Coupling
C7	250		N-6488	SI250	D6-251	5W5T25	GO2K-251		AF Amp. Plate ♦
C8	.01	400	N-1344	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Audio Coupling ♦
C9	.01	400	N-1344	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Output Plate
C10	.05	400	N-1346	P488-05	DF-503	PTE4S5		4TM-S5	Rectifier Plate
C11	.1	200	N-1351	P288-1	DF-104	PTE4P1		2TM-P1	Line Isolation

♦ Items C7, C8, R7, R8 may be combined in one unit in some Models (Part No. N-8215)

CONTROLS

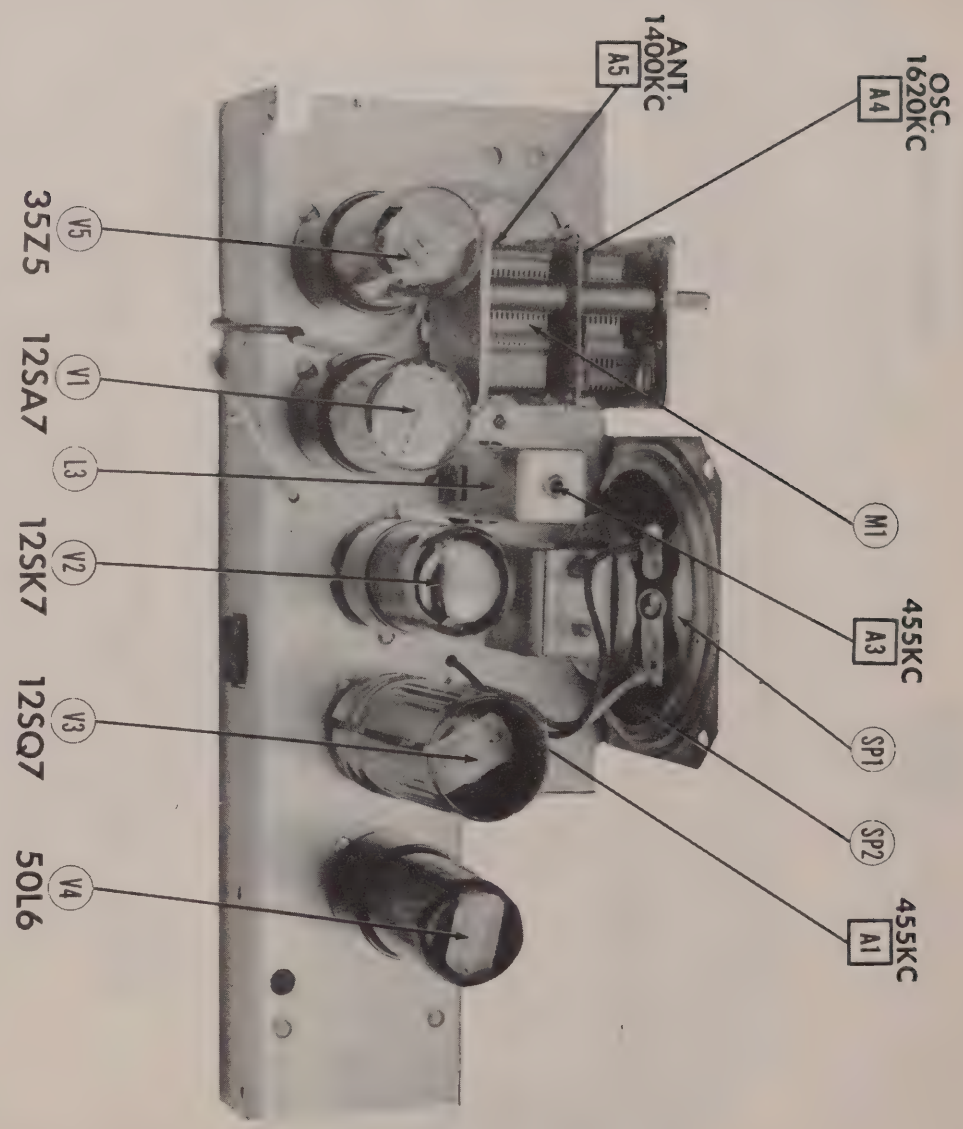
ITEM No.	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESISTANCE	WATTS	FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	
R1A	500K	½	N-8250	Q13-133	AG-60-Z	BSK-60	Volume Control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PART No.	IRC PART No.	
R2	22KΩ	½	N-4025	BTS-22K	Osc. Grid
R3	1.5Meg	½		BTS-1.5Meg	AVC Network - See Note 1
R4	33Ω	½	N-4022		IF Amp. Cathode
R5	47KΩ	½	N-4063	BTS-47K	AVC Network - See Note 4
R6	4.7Meg	½		BTS-4.7Meg	AF Amp. Grid - See Note 2
R7	220KΩ	½	N-2026 ♦	BTS-220K	AF Amp. Plate
R8	470KΩ	½	N-4027 ♦	BTS-470K	Output Grid
R9	180Ω	½	N-4067	BTS-180	Output Cathode
R10	1200Ω	1	N-4900	BTA-1200	Filter
R11	22Ω	1			Series Filament - See Note 3
R12	220KΩ	½	N-4026	BTS-220K	Line Isolation

Note 1. Some Models use 1 Meg. resistor in this application
Note 2. Some Models use 6.8 Meg resistor in this application
Note 3. Some Models use 33Ω resistor in this application
Note 4. Included in Volume Control on some Models.
♦ Items C7, C8, R7 & R8 may be combined in one unit on some Models (Part #8215)

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	3.5KΩ	3.5Ω	290Ω	.6Ω	N-7281	A-3332	A-3025	RO-2 ①	① Drill New Mounting Holes

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			FIRESTONE PART No.	VIKING PART No.	QUAM PART No.	
	FIELD	V.C. IMP.				
SP1	P.M.	3.5Ω	N-8247	35J4	3A07	
	CONE DIA.	V.C. DIA.				
SP2	3 5/16"	9/16"				

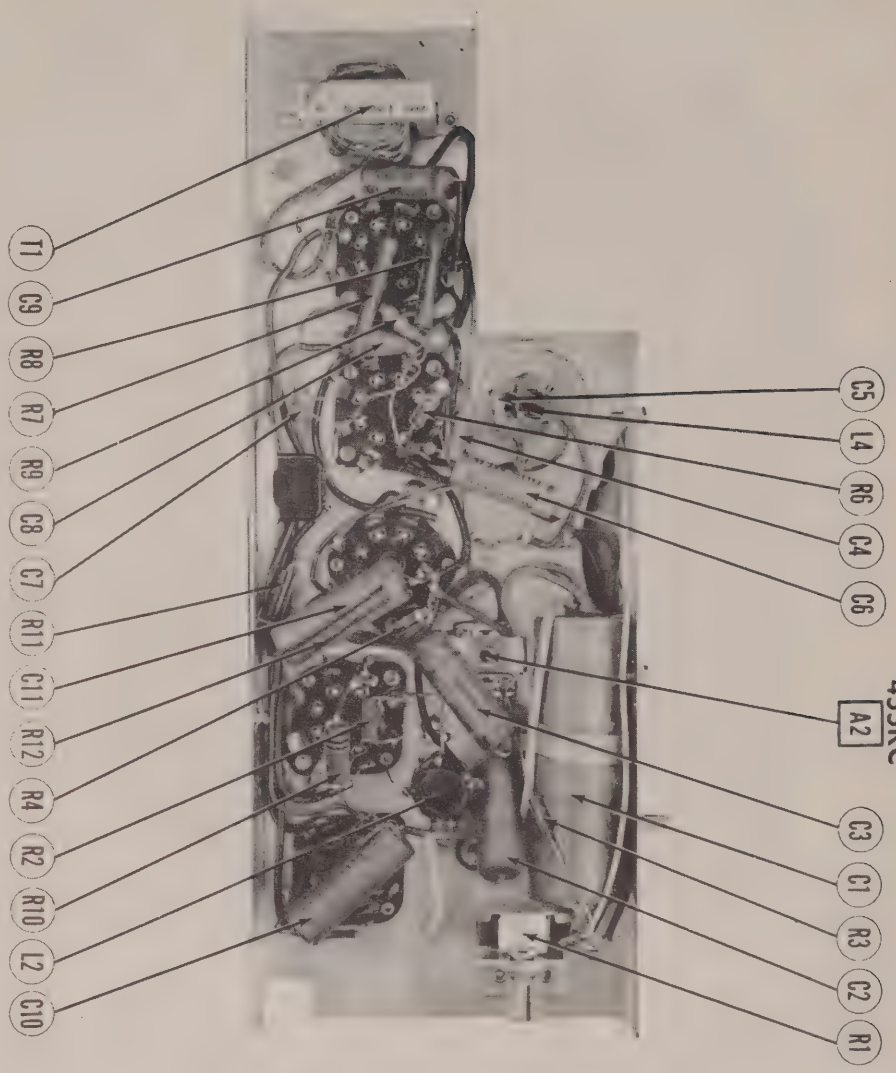
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	FIRESTONE PART No.		
L1	Loop Ant.	3.2Ω		N-8246		
L2	Osc. Coil	.6Ω	7.5Ω	N-7139		
L3	Input IF	16Ω	16Ω	N-7981		
L4	Output IF	17Ω	17Ω	N-7677		

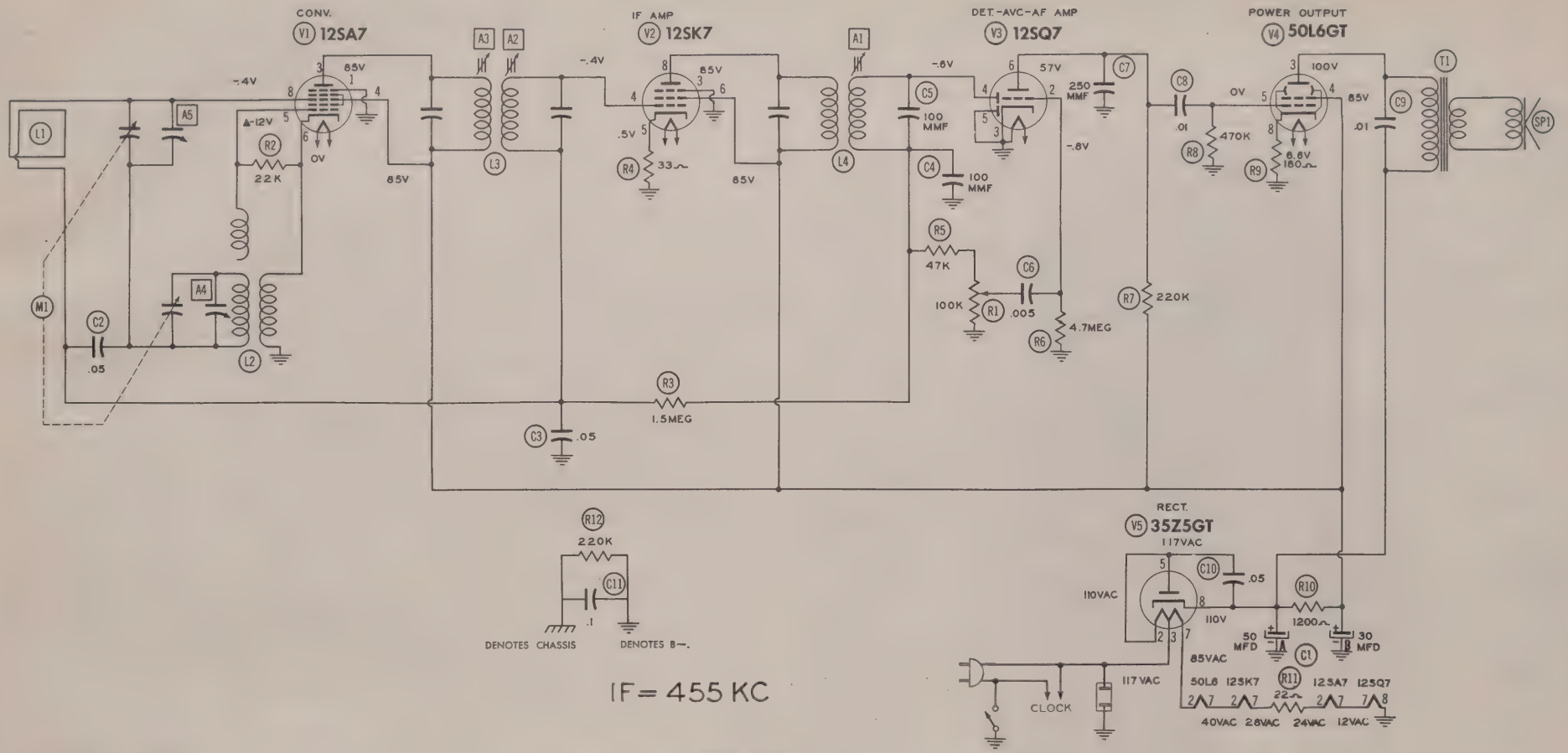
MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M1	2 Gang Var. Cap.	N-7141	(18-397MMF, 18-153MMF)
	Cabinet	#327	
	Knob	N-8254	Tuning
	Knob	N-8251	Volume

CHASSIS—BOTTOM VIEW



FIRESTONE MODEL 4-A-92



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7GT	■0Ω	24Ω	†1.2KΩ	†1.2KΩ	22KΩ	.6Ⅲ	12Ω	2 Meg.
V 2	12SK7GT	■0Ω	58Ω	0Ω	2 Meg.	33Ω	†1.2KΩ	46Ω	†1.2KΩ
V 3	12SQ7GT	▲0Ω	4.7Meg.	0Ω	550KΩ	0Ω	†220KΩ	12Ω	0Ω
V 4	50L6GT	▲0Ω	108Ω	†290Ω	†1.2KΩ	470KΩ	†0Ω	58Ω	180Ω
V 5	35Z5GT	INF.	140Ω	125Ω	INF.	140Ω	INF.	108Ω	70KΩ

▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 8 OF V5
■ MEASURED FROM CHASSIS

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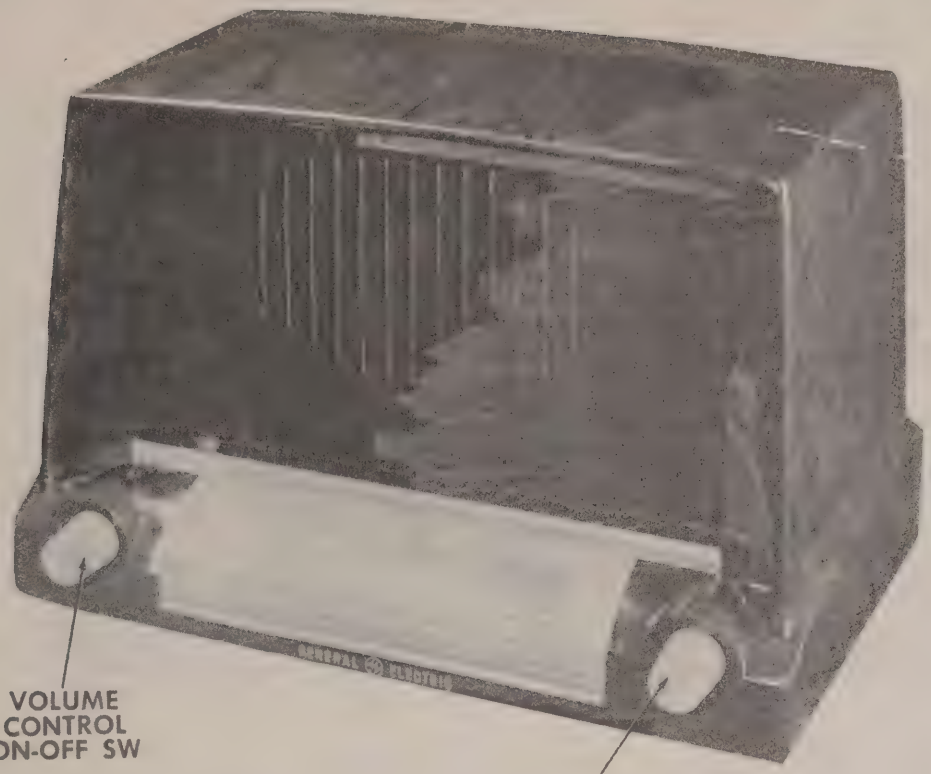
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

GENERAL ELECTRIC
MODELS 422, 423



GENERAL ELECTRIC
MODELS 422, 423

GENERAL ELECTRIC MODEL 422

TRADE NAME	General Electric, Models 422, 423
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, New York.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types 12SK7 RF Amp., 12SA7 Converter, 12BA6 IF Amp., 12SQ7 DET-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	105-120 Volts AC-DC RATINGS .25 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05 MFD	High Side to pin 8, (Grid) of 12SA7, (V2). Low Side to B-.	455KC (400%Mod))	Tuning Gang fully open.	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD) to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion Loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1500 KC	Tune for Max. Output.	"	A6, A7	Fashion Loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC
MODEL 422

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	RF Amplifier	12SK7	12SK7	8N	
V2	Converter	12SA7	12SA7	8R	
V3	IF Amplifier	12BA6	12BA6	7BK	
V4	Det AVC-AF	12SQ7	12SQ7	8Q	
V5	Power Output	35L6GT	35L6GT	7AC	
V6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	50	150	RCE-050	PRS150/50-50		EDL-5515		TVA-2453	Filter (Red)
B	50	150							Filter (Yellow)
C2	.02	400	UCC-041	P488-02	DF-203	PTE4S2		4TM-S2	RF Amp. Decoupling
C3	2		RCN-039		TCZ-2.2		NPOK-2R2		RF Coupling
C4	.02	400	UCC-041	P488-02	DF-203	PTE4S2		4TM-S2	RF Coupling
C5	47	500	UCC-020	1468-00005	D6-470	5W5Q5	GP1K-470	IFM-45	Osc. Grid Cap.
C6	.05	400	UCC-045	P488-05	DF-503	PTE4S5		4TM-S5	AVC Filter
C7	.05	400	UCC-045	P488-05	DF-503	PTE4S5		4TM-S5	Decoupling
C8A	.0035		♦RCW-3036	P688-0033	D6-332		GP2-333-332	♦34C18	Audio Coupling
B	220			SI220	D6-221	5W5T25	GP2K-221		AF Amp. Plate
C	.005			BPD-005	DD-502	PTE6D5	811-005		Audio Coupling
C9	.02	600	UCC-041	P688-02	DF-203	PTE6S2		6TM-S2	Power Output Plate
C10	.05	600	UCC-045	P688-05	DF-503	PTE6S5		6TM-S5	Line Filter
C11	.05	400	UCC-045	P488-05	DF-503	PTE4S5		4TM-S5	Line Isolation
C12	.05	400	UCC-045	P488-05	DF-503	PTE4S5		4TM-S5	Line Isolation

♦Items C8A, C8B, C8C, are combined in one unit in some models

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	RRC-149	Q13-133	AM-60-Z	AN-60	Volume Control
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SWB	K-155	Attach to R1A per instructions

RESISTORS

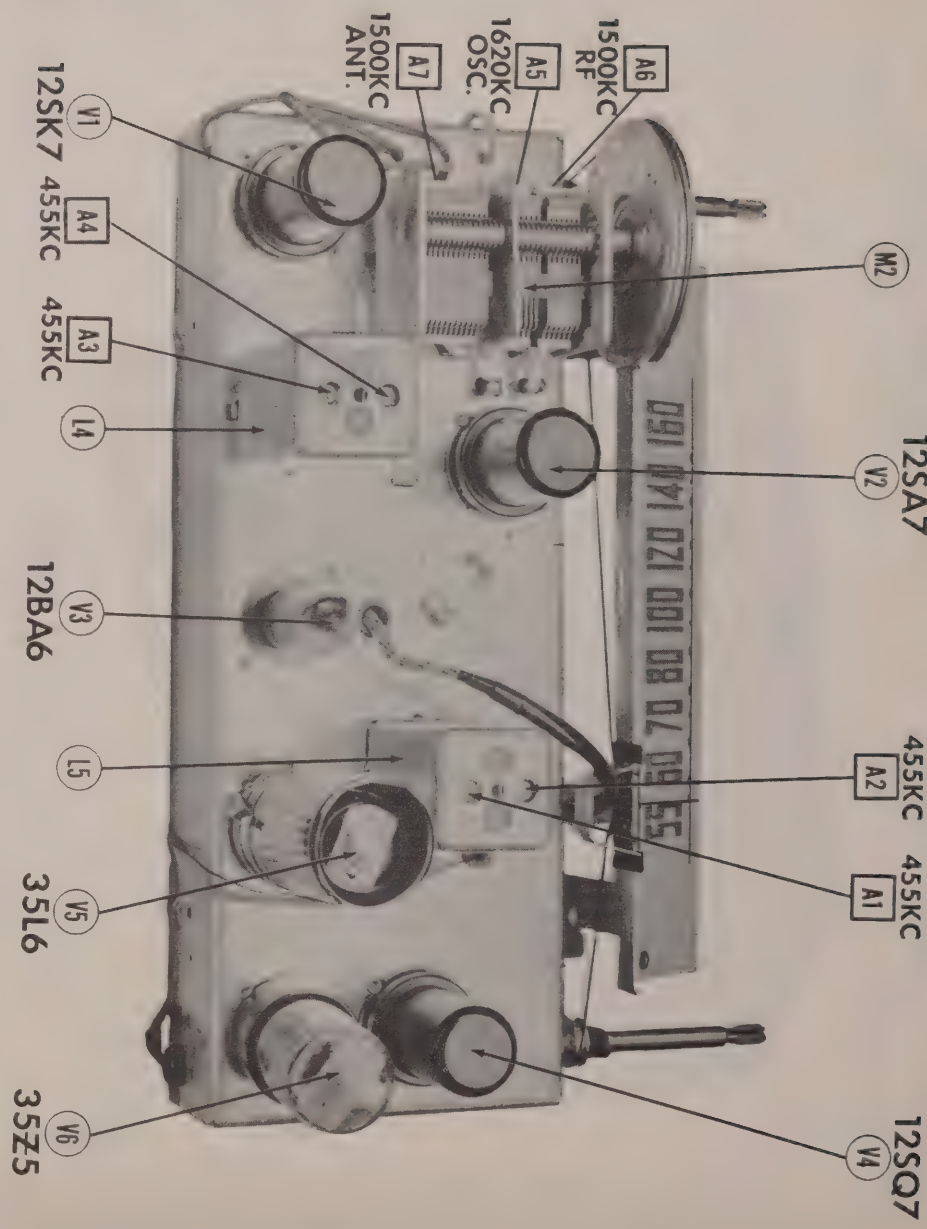
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	IRC PART No.	IDENTIFICATION CODES
R2	2200Ω	½	URD-057	BTS-2200	RF Amp. Decoupling
R3	22KΩ	½	URD-081	BTS-22K	Osc. Grid
R4	470KΩ	½	URD-113	BTS-470K	Line Isolation
R5	68Ω	½	URD-021	BW-½-68	IF Amp. Cathode
R6	2.2Meg	½	URD-129	BTS-2.2 Meg	AVC Newtwork
R7	4.7 Meg	½	URD-137	BTS-4.7 Meg	AFAmp. Grid
R8	470KΩ	½	URD-113	BTS-470K	AF Amp. Plate Decoupling
R9	680KΩ	½		BTS-680K	Output Grid – See Note
R10	150Ω	½	URD-029	BTS-150	Output Cathode
R11	1000Ω	1	URF-049	BTA-1000	Filter
R12	22Ω	½	URD-009	BW-½-22	Surge Limiter

Note: Some Models Use 1 Meg. Resistor in this application

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: General Elect. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	2.7KΩ	3-4Ω	150Ω Tap 5Ω	.5Ω	RTO-083	A-3330	A-3031	RO-2	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V.C. IMP.				
SP1	PM	3-4Ω	ROP-020	46J6	46A1	
	CONE DIA.	V.C. IMP.				
SP2	4"X 6"	9/16"				

R F COILS

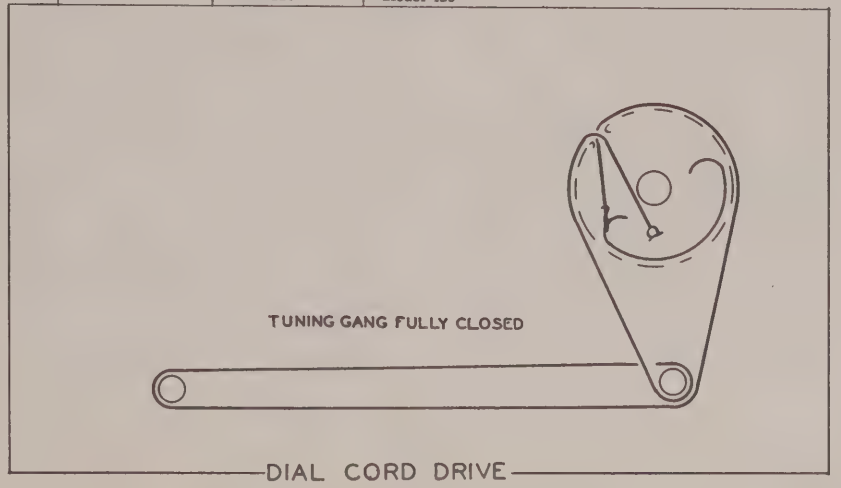
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	GENERAL ELECTRIC PART No.		
L1	Loop Ant.		2.1Ω	RAB-142		
L2	RF Coil	70Ω	1.4Ω	RLI-125		
L3	Osc. Coil	.7Ω	7.8Ω	RLC-105		
L4	Input IF	16Ω	16Ω	RTC-115		
L5	Output IF	22Ω	47KΩ	RTC-116		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					General Elect. PART No.		
M1	Bayonet	6-8	.15	Brown			Type #47

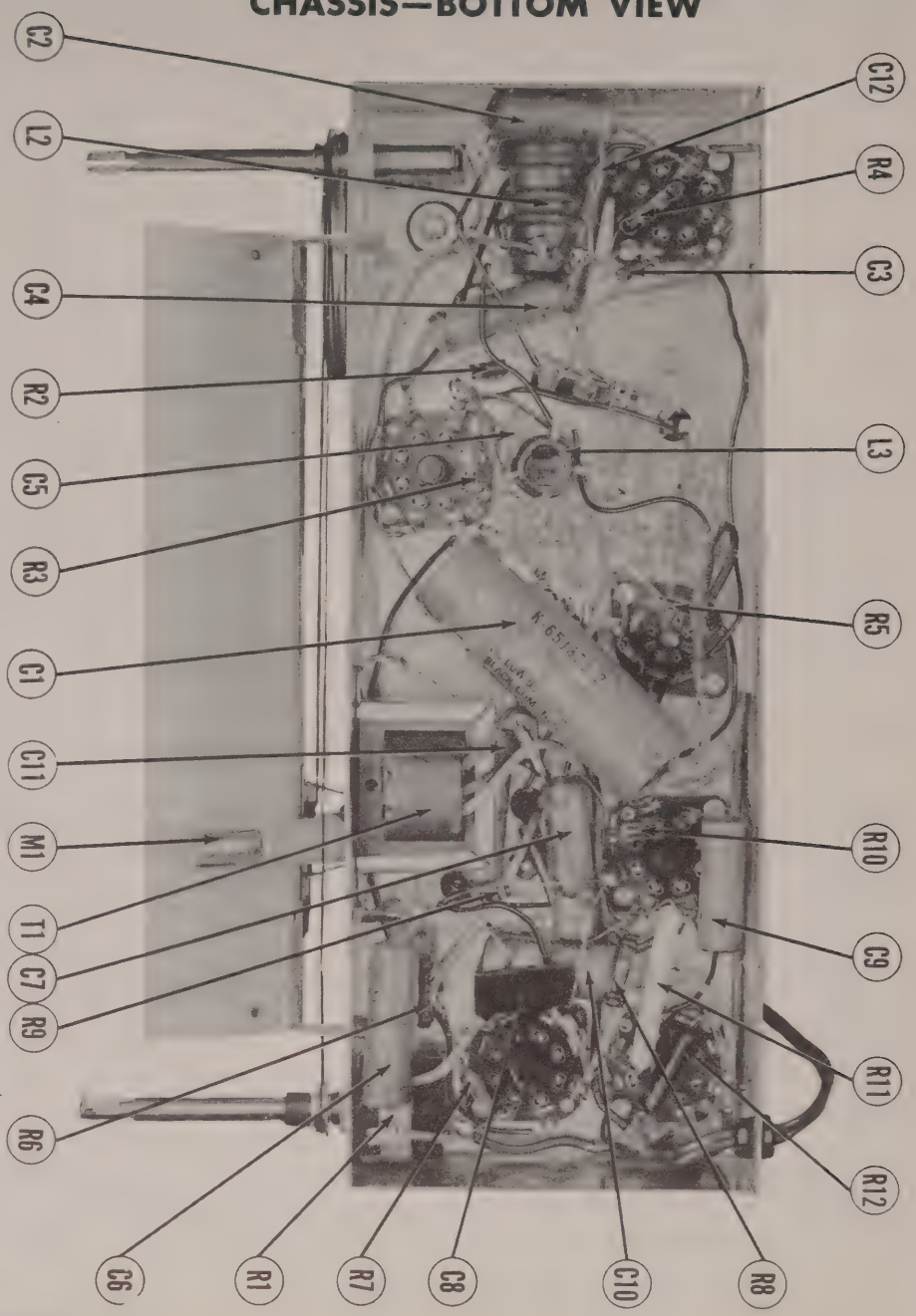
MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M2	3 Gang Var. Cap.	RCT-059	(29-464MMF, 19-128MMF, 14-214MMF)
	Dial Pointer	RDP-064	
	Dial Scale	RDS-110	
	Cabinet	RAU-353	Model 422
	Cabinet	RAU-354	Model 423
	Knob	RDK-181	Model 422
	Knob	RDK-229	Model 423



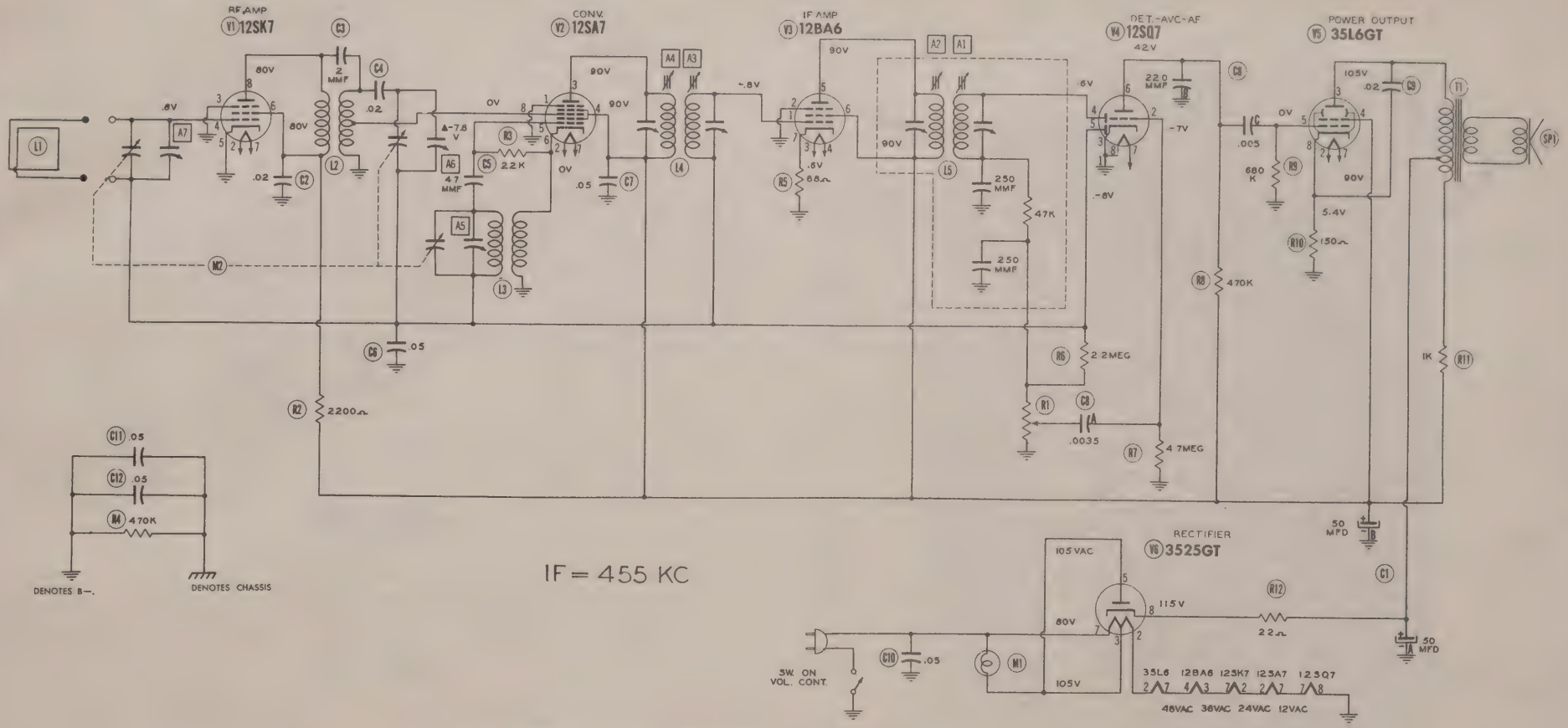
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



GENERAL ELECTRIC MODEL 422

GENERAL ELECTRIC MODEL 422



IF = 455 KC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SK7	0Ω	24Ω	0Ω	2.7Meg	0Ω	†3.2KΩ	36Ω	†3.2KΩ
V 2	12SA7	0Ω	24Ω	†1KΩ	†1KΩ	22KΩ	.6Ω	12Ω	2.8Ω
V 3	12BA6	2.7Meg	0Ω	36Ω	48Ω	†1KΩ	†1KΩ	68Ω	
V 4	12SQ7	0Ω	4.7Meg	0Ω	550KΩ	2.7Meg	†470KΩ	12Ω	0Ω
V 5	35L6GT	Inf.	83Ω	†172Ω	—†1KΩ	680KΩ	0Ω	48Ω	150Ω
V 6	3525GT	Inf.	118Ω	100Ω	†22Ω	100Ω	†27Ω	83Ω	50KΩ

† MEASURED FROM PIN 8 OF V6.
▲ TAKEN WITH VACUUM TUBE VOLTMETER

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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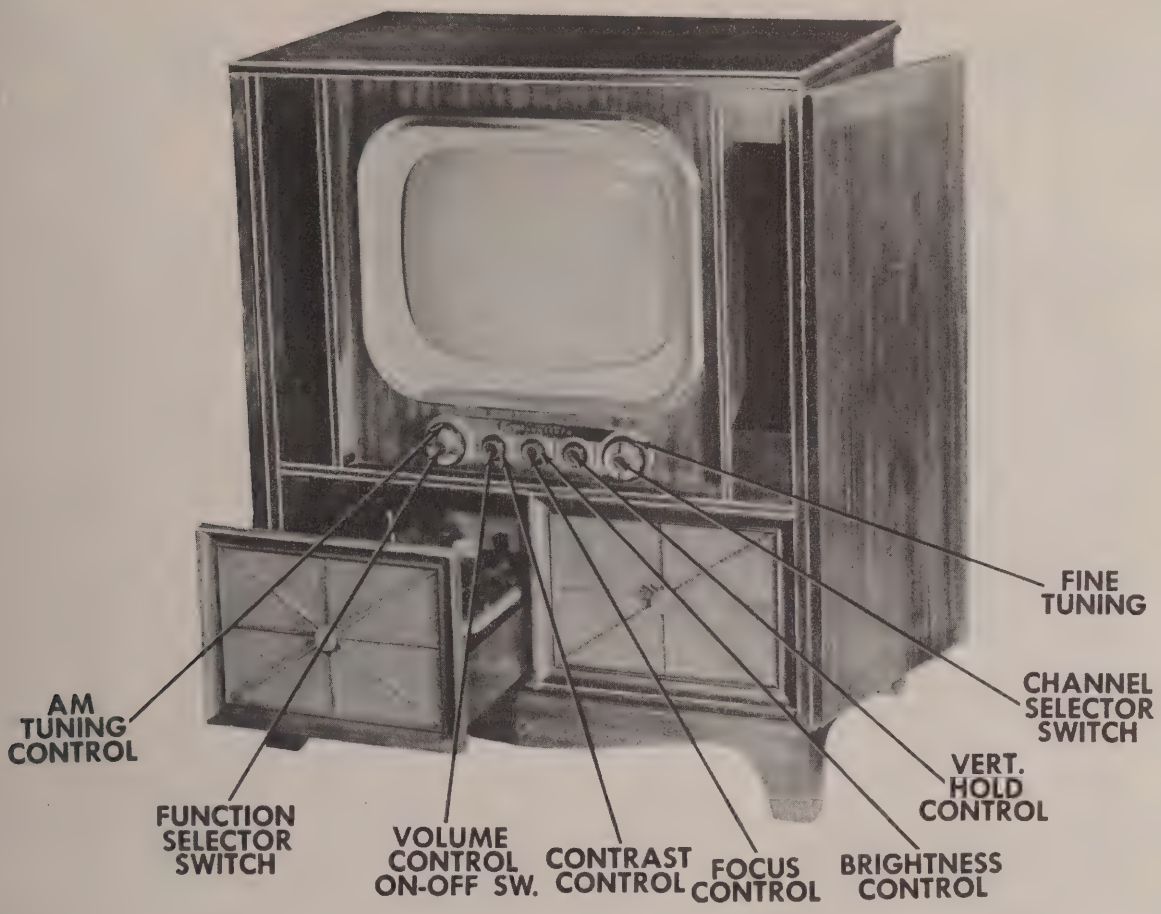

HALLICRAFTERS
MODELS 20990, 20990S, 20994

HALLICRAFTERS MODEL 20994

TRADE NAME,	Hallicrafters Models 20990, 20990S, 20994
MANUFACTURER	Hallicrafters Co., 4401 W. 5th Ave., Chicago (24), Ill.
TYPE SET	TV-AM- Phono Combination Receiver
TUBES	Twenty Four
POWER SUPPLY	110-120 Volts AC-60 cycle RATING 1.5 AMP@ 117 Volts AC
TUNING RANGE—	(TV) Channels 2 through 13 (AM) 535-1620KC

INDEX

Alignment Instructions 6, 7
Drive Cord Stringing 8
Disassembly Instructions 8
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions ..... 13 thru 16
Photographs
- Cabinet - Rear View 11
- Capacitor and Alignment Identification 4, 9

Photographs (cont.)
- Chassis - Top View 3
- RF Tuner 10
- Resistor and Inductor Identification 12, 17

Resistance Measurements 8
Schematic 2
Tube Placement Charts 5

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT - SEE PHOTOFACT FOLDER 11-SET NO. 75.

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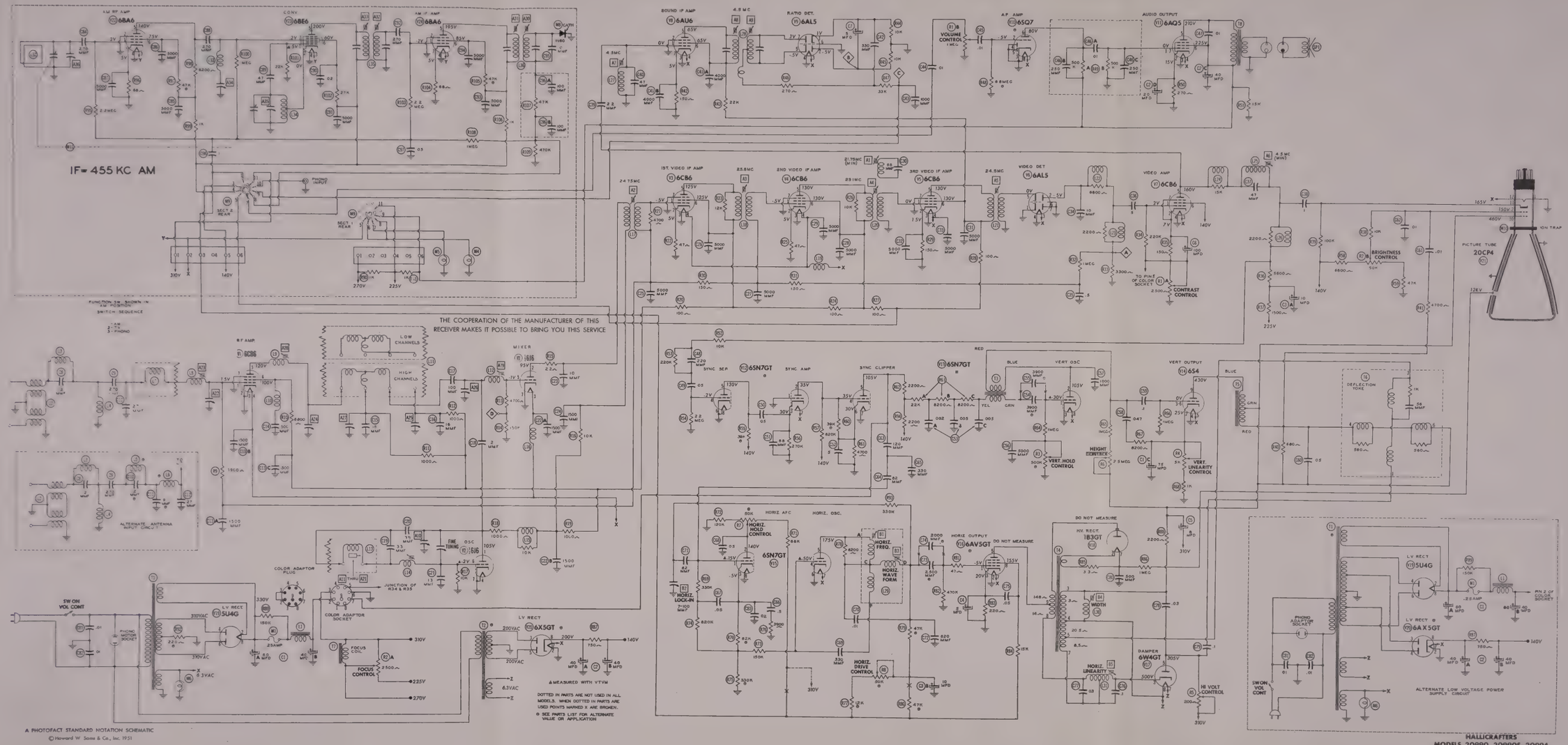
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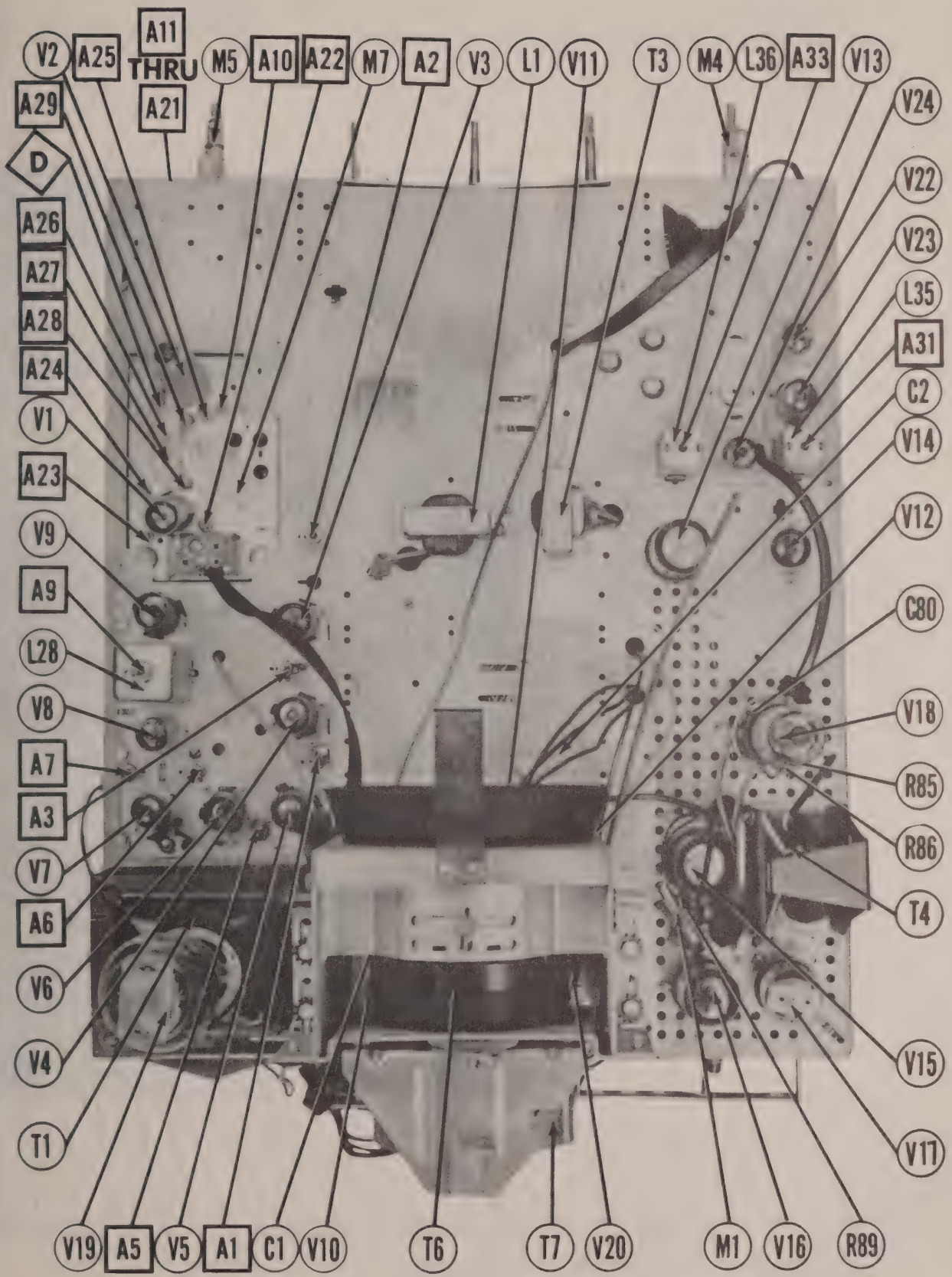
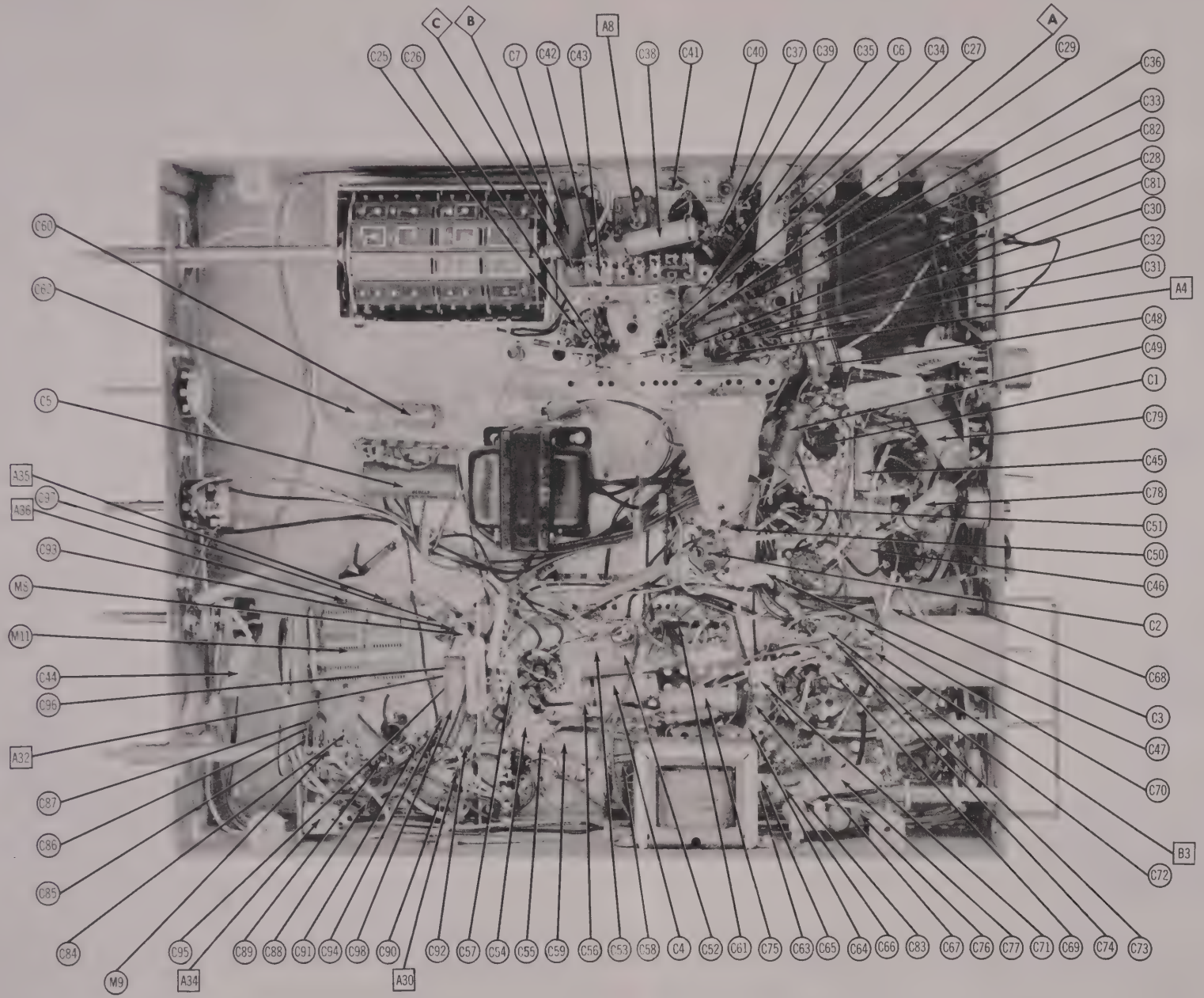
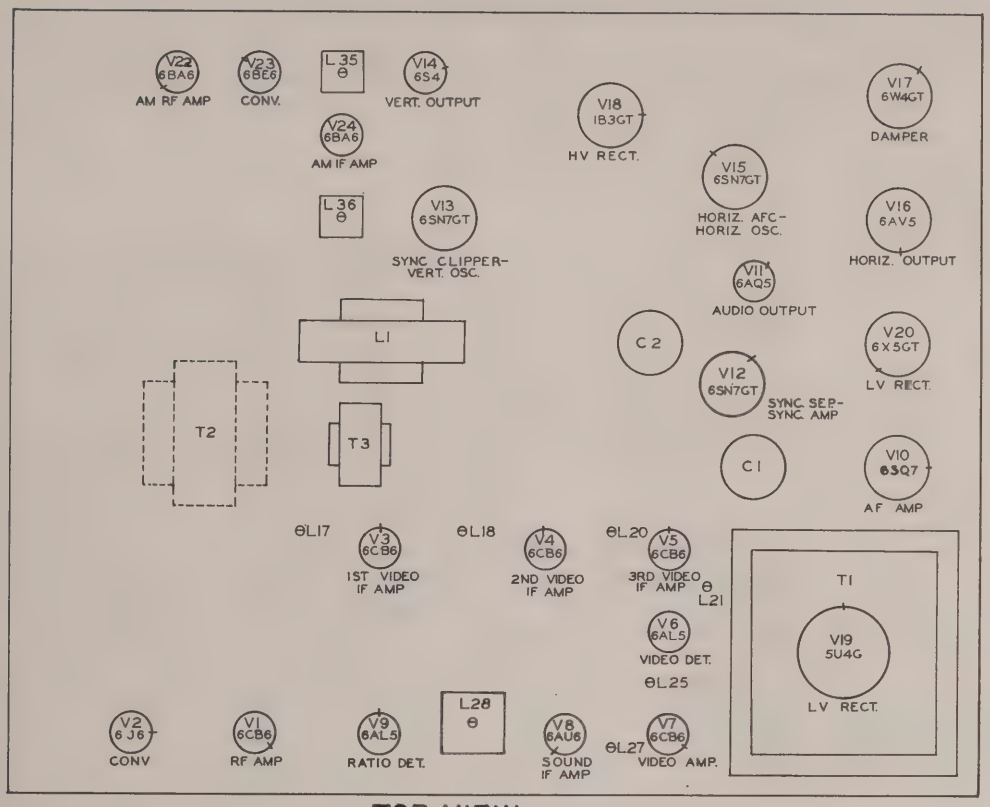


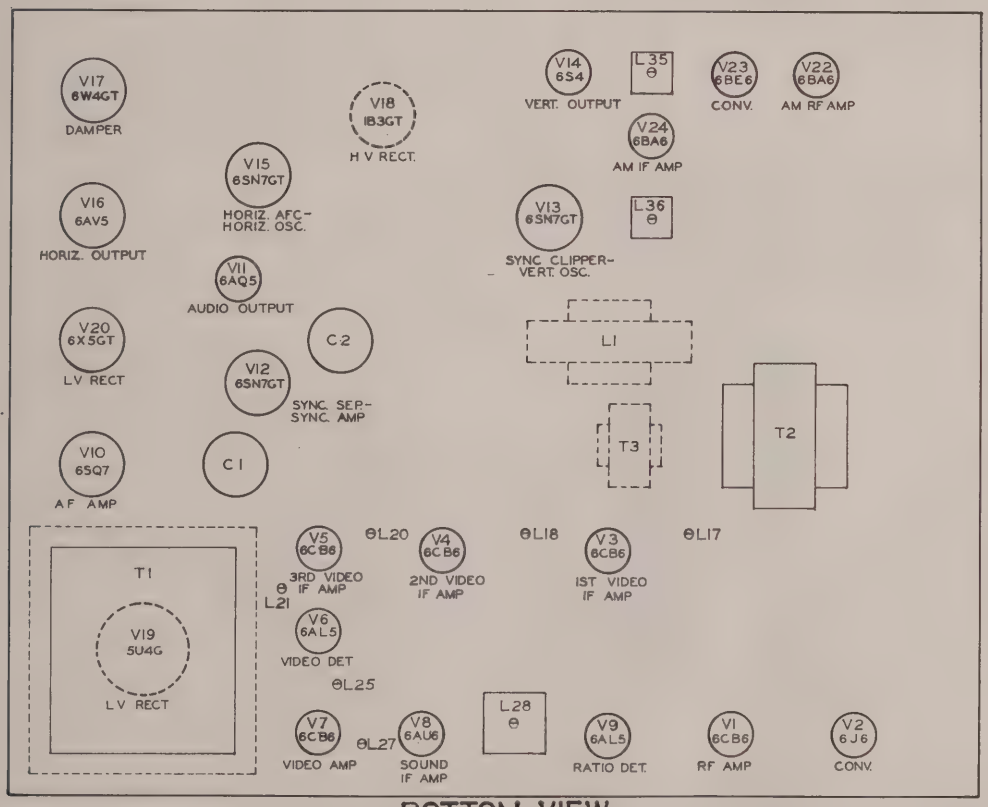
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



TOP VIEW



BOTTOM VIEW

TUBE PLACEMENT CHART

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horisontal oscillator tube, (V15), from its socket.
Turn the function selector switch to TV, (center position).

VIDEO IF ALIGNMENT

Remove the converter tube, (V2), from its socket and replace it with a 6J6 which has Pin 1 removed, this will disable the local oscillator and and prevent the possibility of erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	21.75MC	Any	DC probe to Point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	24.75MC	"	"	A2	Adjust for maximum deflection. Attenuate signal gen. to maintain 2 Volt reading.
3.		"	25.6MC	"	"	A3	"
4.	"	"	23.1MC	"	"	A4	"
5.	"	"	24.5MC	"	"	A5	"

OVERALL VIDEO IF RESPONSE CHECK

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	24MC (10MC Swp.)	21.75MC 26.25MC	Any	Vert. Amp. to Point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary retouch A2 thru A5 for proper response.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to Pin 1, (Grid), of 6CB6 (V7). Low side to chassis.	4.5MC (400%)	Any	DC probe thru detector, (Fig.2), to pin 11 of picture tube. Common to chassis.	A6	Adjust for MINIMUM400% indication on scope.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to Pin 1, (Grid), of 6CB6,(V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to Point (B). Common to chassis.	A7, A8	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to Point (C). Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.01MFD	High side to Pin 1, (Grid) of 6CB6, (V7). Low side to chassis.	4.5MC 450KC Swp.	4.5MC	Any	Vert. Amp. to Point (B). Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C7. Adjust for maximum amplitude and symmetry as per Fig. 3.
9.	"	"	"	"	"	Vert. Amp. to Point (C). Low side to chassis.	A9	Reconnect capacitor C7. Adjust A9 so 4.5MC occurs at center of crossover lines as per Fig. 4. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect the negative lead of a 1.5 volt battery to the ungrounded lead of C25, connect the positive lead to chassis.
Set the fine tuning control to the mid-position of its range.
The Sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC	13	Vert. Amp. to Point (A). Low side to chassis.	A10	Adjust to place sound markers in "notch" as shown in Fig. 5.
11.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A11	Adjust to place sound marker in "notch" as shown in Fig. 5. If any channel strip shows insufficient range, readjust A10 and repeat adjustment of ALL channel strip adjustments.
			201MC (10MC Swp)	199.25MC 203.75MC	11		A12	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A13	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A14	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A15	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A16	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A17	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A18	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A19	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A20	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A21	

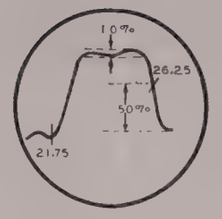


FIG.1

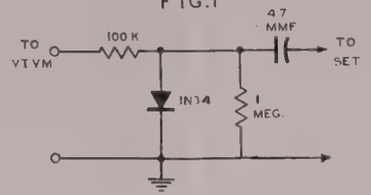


FIG. 2

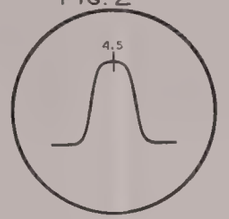


FIG. 3

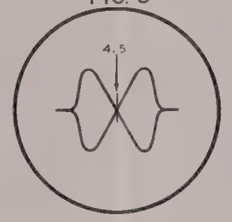


FIG. 4

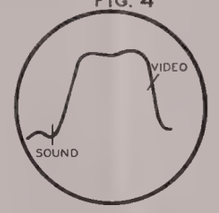


FIG.5

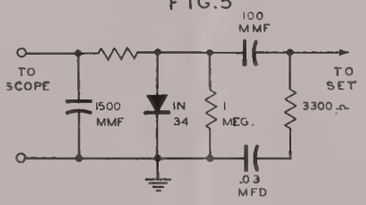


FIG.6

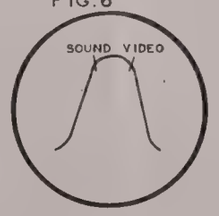


FIG.7

TV ALIGNMENT INSTRUCTIONS (CONT.)

ANTENNA CIRCUIT ALIGNMENT

The sweep generator output lead should be terminated with its charactistic impedance, usually 50 ohms.
Leave the 1.5 volt bias connected as during oscillator alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	85MC (10MC Swp.)	83.25MC 87.75MC	6	Vert. Amp. through detector, (Fig.5) , to pins, (plate), of 6CB6 (V1). Low side to chassis.	A22	Adjust for symmetrical response curve similar to Fig. 1.
13.	"	"	177MC	175.25MC	7	"	A23	Adjust for response curve similar to Fig. 8. If A23 requires considerable adjustment, repeat step 12.
14.	"	"	79MC	77.25MC	5	"		Check all low band channels for response curve similar to Fig. 7. If necessary retouch A22 for compromise which gives best response over the low band channels.
			69MC (10MC Swp.)	67.25MC 71.75MC	4			
			63MC (10MC Swp.)	61.25 65.75MC	3			
			57MC (10MC Swp.)	55.25MC 59.75MC	2			
15	"	"	183MC (10MC Swp.)	181.25MC 185.75MC	8	"		Check all high band channels for response similar to Fig. 8. If necessary retouch A23 for compromise which gives best response over the high band channels.
			189MC (10MC Swp.)	187.25MC 191.75MC	9			
			195MC (10MC Swp.)	193.25MC 197.75MC	10			
			201MC (10MC Swp.)	199.25MC 203.75MC	11			
			207MC (10MC Swp.)	205.25MC 209.75MC	12			

RF ALIGNMENT

Leave the bias battery connected.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to Point (D). Low side to chassis.	A24, A25, A26	Adjust for response curve similar to Fig. 9. A24 effects the center frequency of the response curve, A25 effects the tilt of the response, and A26 effects the band width.
17.	"	"	79MC (10MC Swp.)	77.25MC 81.75MC	5	"		Check for response curve similar to Fig. 9. If necessary retouch A24, A25 and A26 for compromise which gives the best overall response across the low band channels.
			69MC (10MC Swp.)	67.25MC 71.75MC	4			
			63MC	61.25MC	3			
			57MC (10MC Swp.)	55.25MC 59.75MC	2			
18.	"	"	207MC (10MC Swp.)	205.25MC 209.25MC	12	"	A27, A28 A29	Adjust for response curve similar to Fig. 10. A27 effects the band width, A28 effects the center frequency, and A29 effects the tilt of the curve.
19.	"	"	213MC (10MC Swp.)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 10. If necessary retouch A27, A28 and A29 for compromise which gives the best overall response across the high band channels. Recheck the low band channels and if necessary repeat steps 16 through 19.
			201MC (10MC Swp.)	199.25MC 203.75MC	11			
			195MC (10MC Swp.)	193.25MC 197.75MC	10			
			189MC (10MC Swp.)	187.25MC 191.75MC	9			
			183MC (10MC Swp.)	181.25MC 185.75MC	8			
			177MC (10MC	175.25MC 179.75MC	7			

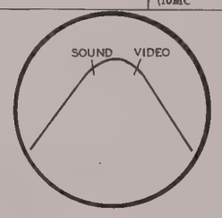


FIG.8

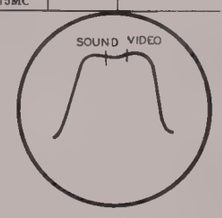


FIG.9

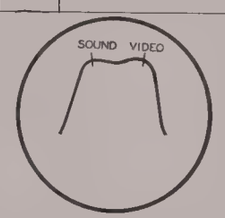


FIG.10

RADIO ALIGNMENT INSTRUCTIONS

AM ALIGNMENT

Turn the function selector switch to AM (counter-clockwise).
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
20	.005MFD	High side to Pin 7, (Grid), of 6BE6, V23). Low side to chassis.	455KC (400% Mod.)	AM	Tuning gang fully open.	Across voice coil.	A30, A31 A32, A33	Detune A34. Adjust for maximum output.
21	"	High side to Pin 1, (Grid), of 6BA6, (V22). Low side to chassis.	"	"	"	"	A34	Adjust for MINIMUM output.
22	"	"	1620KC	"	"	"	A35	Adjust for maximum output.
23		Loop	1400KC	"	Tune for max. output.	"	A36	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

RESISTANCE MEASUREMENTS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	1Meg	0Ω	0Ω	.1Ω	■2KΩ	■7.8KΩ	0Ω		
V 2	6J6	■3KΩ	■12KΩ	.1Ω	0Ω	150KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	■950Ω	■950Ω	0Ω		
V 4	6CB6	1Meg	47Ω	0Ω	.1Ω	■850Ω	■850Ω	0Ω		
V 5	6CB6	.2Ω	150Ω	0Ω	.1Ω	■850Ω	■850Ω	0Ω		
V 6	6AL5	0Ω	3.3KΩ	.1Ω	0Ω	.3Ω	0Ω	0Ω		
V 7	6CB6	220KΩ	600Ω	.1Ω	0Ω	†7.1KΩ	■750Ω	600Ω		
V 8	6AU6	1Ω	0Ω	0Ω	.1Ω	■23KΩ	■23KΩ	150Ω		
V 9	6AL5	10KΩ	10KΩ	.1Ω	0Ω	Inf.	0Ω	Inf.		
V 10	6SQ7	0Ω	6.8Meg	0Ω	0Ω	0Ω	†500KΩ	.1Ω	0Ω	
V 11	6AQ5	500KΩ	270Ω	0Ω	.1Ω	†1.4KΩ	†1.1KΩ	500KΩ		
V 12	6SN7GT	0Ω	■90KΩ	270KΩ	2.2Meg	■40KΩ	0Ω	.1Ω	0Ω	
V 13	6SN7GT	1.2Meg	#2Meg	0Ω	43KΩ	■5.1KΩ	4.7KΩ	0Ω	.1Ω	
V 14	6S4	Inf.	1.7KΩ	1Meg	0Ω	.1Ω	1Meg	Inf.	Inf.	#3.8KΩ
V 15	6SN7GT	1.4Meg	†60KΩ	410KΩ	480KΩ	†95KΩ	0Ω	.1Ω	0Ω	
V 16	6AV5	470KΩ	0Ω	220Ω	Inf.	#20Ω	Inf.	.1Ω	†15KΩ	
V 17	6W4GT	Inf.	Inf.	180KΩ	Inf.	†110Ω	Inf.	#25Ω	#25Ω	
V 18	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TOP CAP #182Ω
V 19	5U4G	Inf.	16KΩ	Inf.	250Ω	Inf	250Ω	Inf.	16KΩ	
V 20	6X5GT	#30Ω	0Ω	110Ω	Inf.	100Ω	#30Ω	.1Ω	50KΩ	
V 21	20CP4	0Ω	■19KΩ	PIN 10 #2.2KΩ	PIN 11 ■100KΩ	PIN 12 .1Ω				
V 22	6BA6	3.6Meg	0Ω	.1Ω	0Ω	▲■10KΩ	▲■49KΩ	68Ω		
V 23	6BE6	22KΩ	.6Ω	.1Ω	0Ω	▲■750Ω	▲■27KΩ	2.4Meg		
V 24	6BA6	3.6Meg	0Ω	.1Ω	0Ω	▲■1.7KΩ	▲■49KΩ	68Ω		

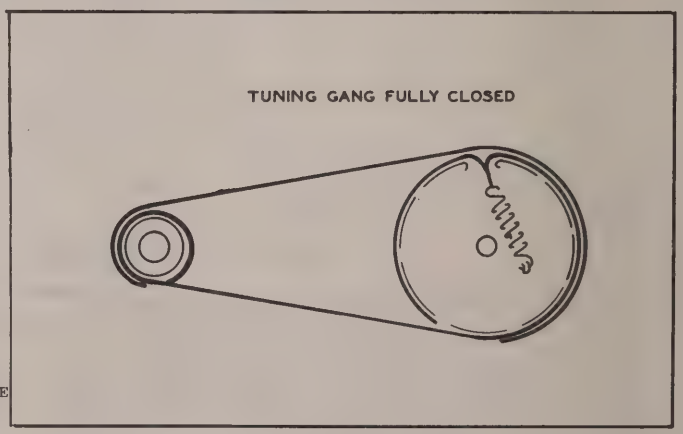
ALL MEASUREMENTS TAKEN IN TV POSITION UNLESS NOTED
ALL CONTROLS SET FOR NORMAL OPERATION
†MEASURED FROM PIN 8 OF V19
■ MEASURED FROM PIN 8 OF V20
MEASURED FROM PIN 3OF V17
▲ MEASURED IN AM RADIO POSITION

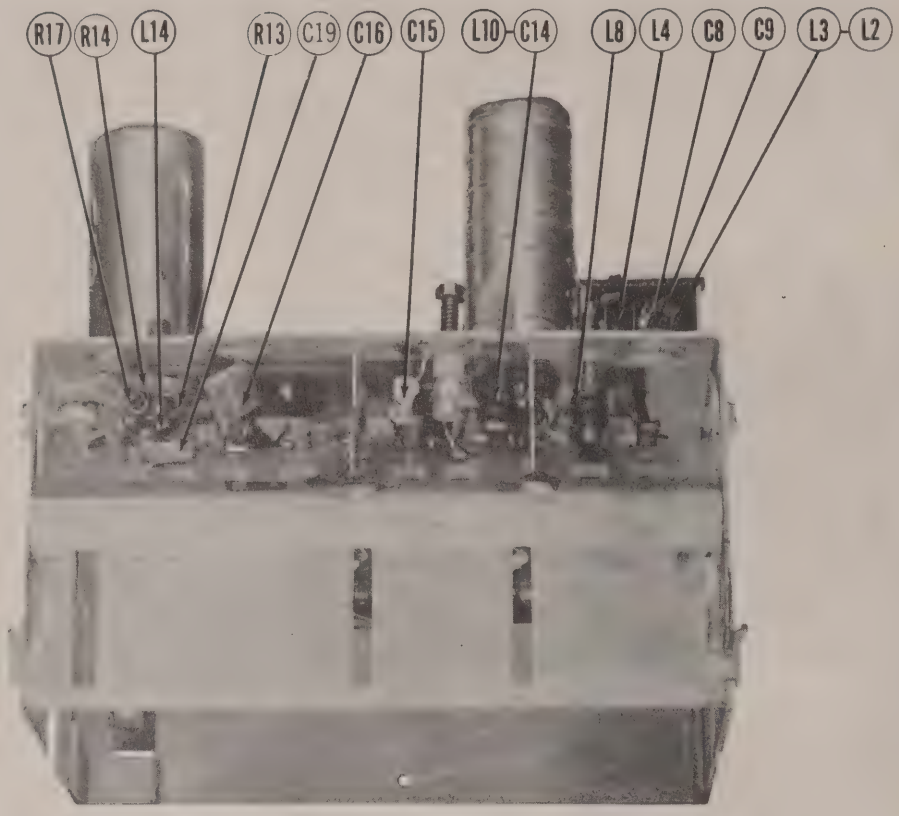
DISASSEMBLY INSTRUCTIONS

1. Remove nine push-on type control knobs.
2. Disconnect built-in antenna.
3. Remove nine wood screws from rear cover. Remove rear cover.
4. Disconnect speaker.
5. Disconnect 110V. ine from phono motor.
6. Disconnect phono audio input jack.
7. Disconnect AM antenna.
8. Remove cabinet light.
9. Remove four metal screws from chassis. Remove chassis.
10. Remove four 1/32 hex nuts from speaker. Remove speaker.

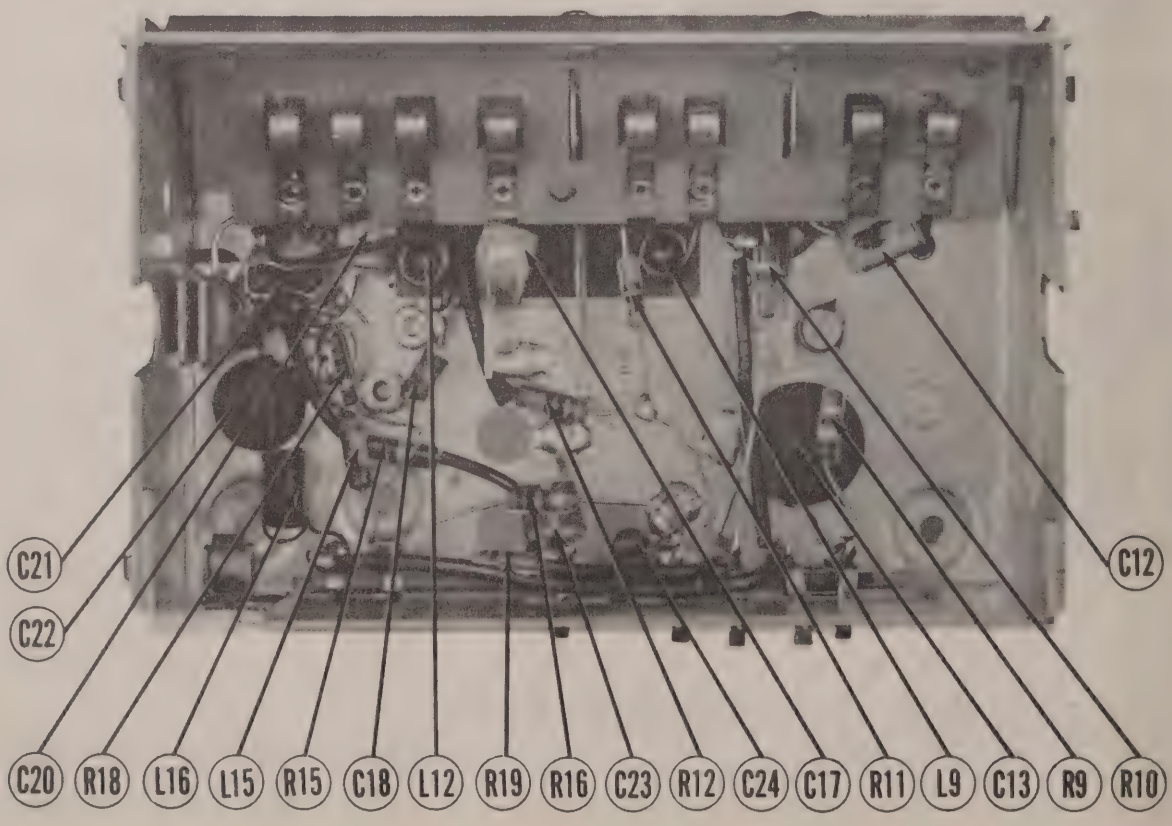
NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE THE CHASSIS AS OUTLINED ABOVE.

DIAL CORD STRINGING

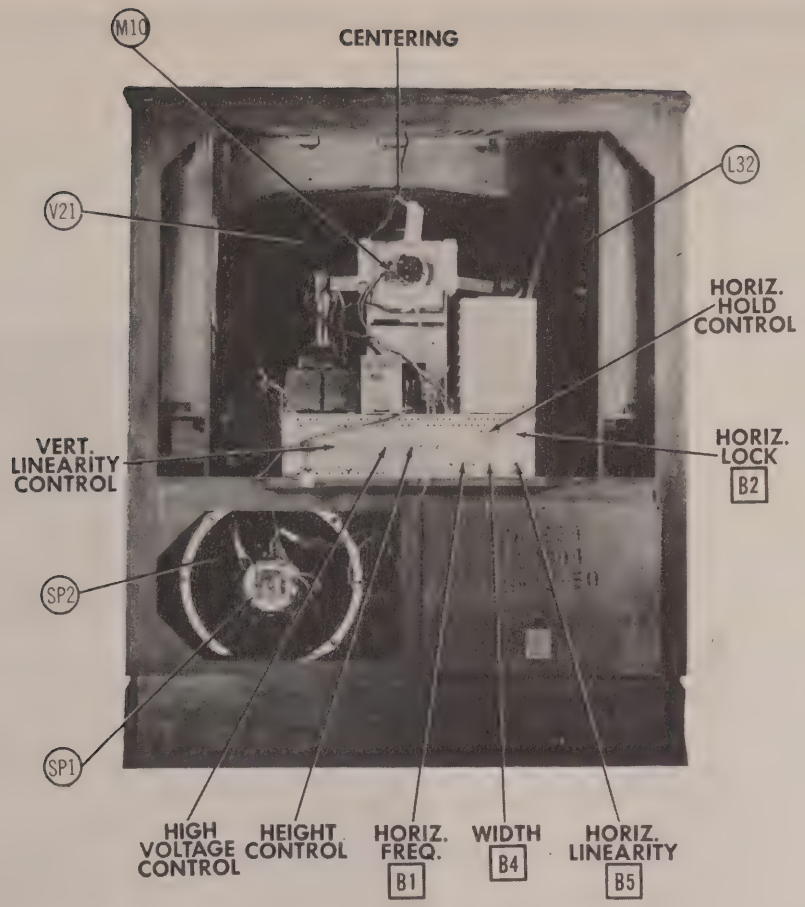




RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ALIGNMENT

1. Turn the set on and tune in a TV station, preferably a test pattern.
2. Turn the horizontal hold control to fully counter-clockwise.
3. Adjust the horizontal frequency slug, (B1), until the horizontal blanking bar appears in the picture as a single vertical bar.
4. Turn the hold control fully clock-wise and momentarily interrupt the signal by switching to another channel and back again . There should be three or four sloping bars in the picture. If more than four bars are present, turn the horizontal lock trimmer , (B2) slightly clockwise. If less than threebars are present adjust B2 slightly counter-clockwise.
5. Repeat steps 2 and 3 . If the above conditions cannot be obtained, proceed with HORIZONTAL WAVEFORM ADJUSTMENT.

HORIZONTAL WAVEFORM ADJUSTMENT

Connect the vertical input lead of an oscilloscope through a 47KΩ resistor, to terminal C of L 29.
Turn the horizontal hold control to the mid-position of its range.
Adjust the horizontal waveform slug , (B3), until the broad and narrow peaks of the waveform on the scope are of equal height as shown in Fig. 11. If necessary adjust B1 to keep the picture synchronized. REPEAT HORIZONTAL OSCILLATOR ALIGNMENT.

HORIZONTAL DRIVE WIDTH AND LINEARITY ADJUSTMENTS

Adjust the horizontal drive control clock-wise until a bright vertical line appears in the picture, then counter-clockwise just enough to remove the vertical line.
Adjust the width slug, (B4) until the picture is slightly wider than necessary to fill the mask horizontally.
Adjust the horizontal linearity slug (B5) until the picture is symmetrical from left to right.

HIGH VOLTAGE ADJUSTMENT

Connect a 50 megohm bleeder, consisting of 9-5 megohm, 1-4 megohm and 1-1 megohm resistor is series, between the high voltage lead and chassis. Make the resistor string self supporting and connect the 1 megohm end to chassis. Keep the resistors separated from each other and away from the chassis.
Connect a VTVM across the 1 megohm resistor and adjust the high voltage adjustment until the meter reads 270 volts, (the meter reading 1/50th of the high voltage, 50 x 270 Vequals 13,000 volts).

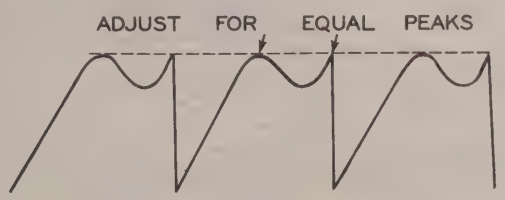
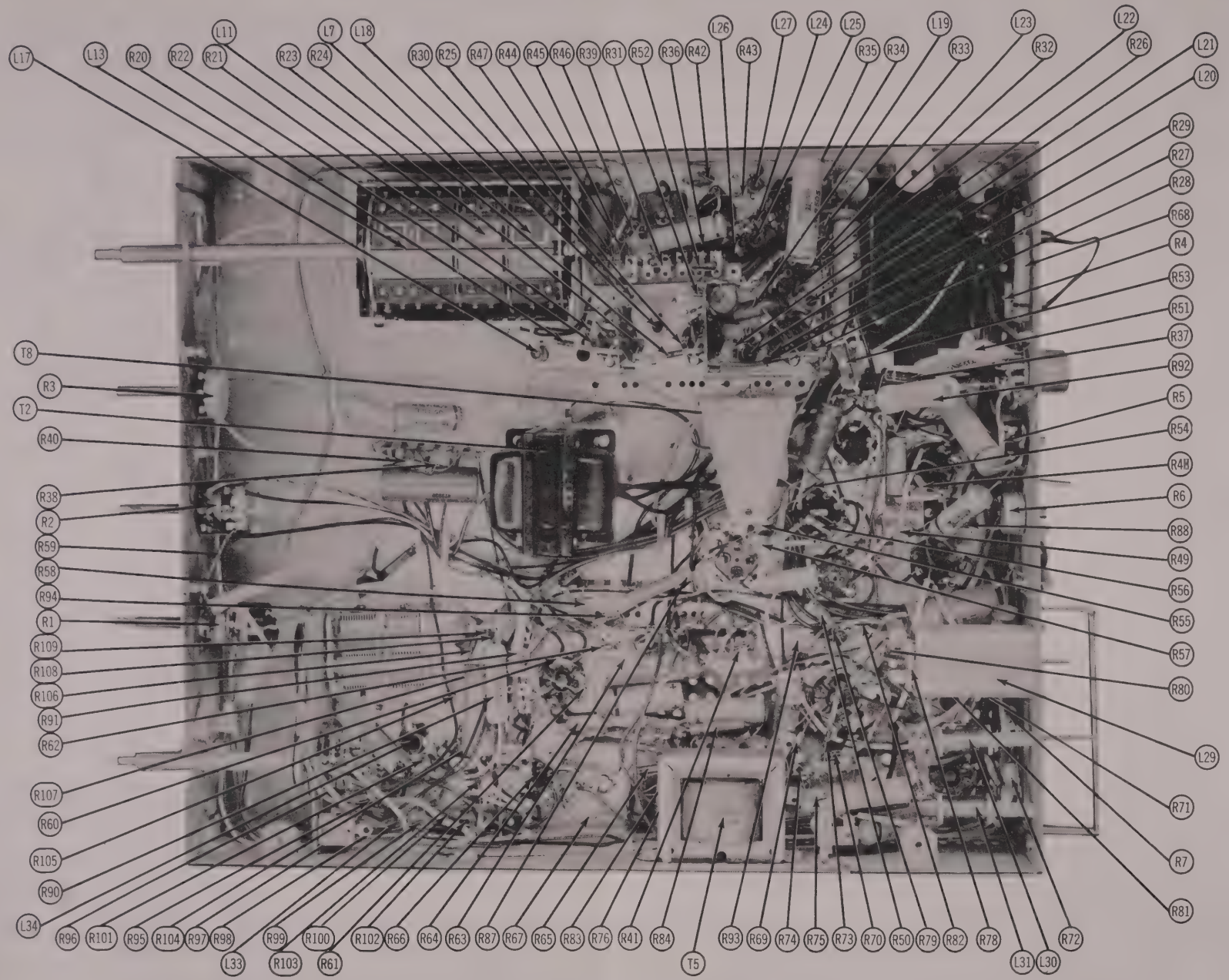


FIG. 11



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	90X6CB6	6CB6	7CM	
V2	Converter	90X6J6	6J6	7BF	
V3	1st. Video IF Amp.	90X6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	90X6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	90X6CB6	6CB6	7CM	
V6	Video Detector	90X6AL5	6AL5	6BT	
V7	Video Amplifier	90X6CB6	6CB6	7BT	
V8	Sound IF Amp.	90X6AU6	6AU6	7BK	
V9	Ratio Detector	90X6AL5	6AL5	6BT	
V10A	AF Amplifier	90X6SQ7	6SQ7	8Q	
B	AF Amplifier	90X6AV6	6AV6	7T	
V11	Audio Output	90X6AQ5	6AQ5	7BZ	
V12A	Sync. Seperator-Sync. Amplifier	90X6SN7GT	6SN7GT	8BD	
B	Sync. Seperator-Sync. Amplifier	90X12AU7	12AU7	9A	
V13A	Sync. Clipper-Vert. Oscillator	90X6SN7GT	6SN7GT	8BD	
B	Sync. Clipper-Vert. Oscillator	90X12AU7	12AU7	9A	
V14	Vert. Output	90X6S4	6S4	9AC	
V15	Horizontal AFC.-Horiz. Oscillator	90X6SN7BT	6SN7GT	8BD	
V16A	Horiz. Output	90X6AV5GT	6AV5GT	6CK	
B	Horiz. Output	90X6AU5GT	6AU5GT	6CK	
V17	Damper	90X6W4GT	6W4GT	4CG	
V18	HV. Rectifier	90X1B3GT	1B3GT	3C	
V19	LV Rectifier	90X5U4G	5U4G	5T	
V20A	LV Rectifier	90X6X5GT	6X5GT	6S	
B	LV Rectifier	90X6AX5GT	6AX5GT	6S	
V22	AM RF Amp.	90X6BA6	6BA6	7BK	
V23	AM Converter	90X6BE6	6BE6	7CH	
V24	AM IF Amp.	90X6BA6	6BA6	7BK	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: THOMAS PART No.	RTMA BASE TYPE	NOTES
V21	20CP4	20CP4		12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	60	450	45B173	AFH 2-61		UPT62245		TVL-2770	▲ Filter
B	40	450		PRS 50/100		BRH501		TVA-1310	■ Filter
C	75	50							▲ Vert. Amp. Cathode
C2A	40	450	45B174	AFH 4-93		UP4445C		TVL-4739	● Filter
B	40	250				BR4025			■ Filter
C	40	250							▲ Audio Output Dec. Audio Cathode
D	20	25							
C3A	10	450	45A172	PRS450/10-10		BRD1145A		TVA-2722	Filter
B	10	450							Horiz. Osc. Dec.
C4	5	50	45B175	PRS150/4		BR550		TVA-1303	Horiz. Output Cathode
C5	8	475	45A103	PRS500/8		BR850A		TVA-1902	Vert. Output Dec.
C6	100	10	45B170	PRS12/100		BRH121A		TVA-1130	Video Amp. Cath.
C7	5	50	45B175	PRS150/4		BR550		TVA-1303	Stabilizing Cap.
C8	12			SI12	D6-120		GP1K-121	5GA-Q15	RF Coupling
C9	270			SI270	D6-271		GP2K-2..	5GA-T27	RF Coupling
C10	12			SI12	D6-120		GP1K-120	5GA-Q15	RF Coupling †
C11	9								Fixed Trimmer †
C12	27								Fixed Trimmer
C13A	1500			BPD-2X0015	DD-2-152		812-0015	5HK-2D15	AGC Filter
B	1500			BPD-0015	DD-152		801-0015	5HK-D15	RF Amp. Fil.
C	1500								RF Bypass
C14	1500			SI1500	D6-152		GP2L-152	5HK-D15	RF Amp. Screen
C15	18								Fixed Trimmer
C16	16								Fixed Trimmer
C17	100			SI100	D6-101		GP1K-101	5GA-T1	RF Coupling
C18	2.2			SI2.2NP0	TCZ-2.2		NP0K-2R2		Osc. Coupling
C19	3.3						N750K-3R3		Fixed Trimmer
C20	39								Osc. Feedback
C21	13								Osc. Grid Cap.
C22A	1500			BPD-2X0015	DD-2-152		812-0015	5HK-2D15	Conv. Fil. Bypass
B	1500								RF Bypass
C23	10			SI10NP0	TCZ-10		NP0K-100	5TCC-Q1	Fixed Trimmer
C24	1500			SI1500	D6-152		GP2L-152	5HK-D15	Conv. Dec.
C25	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AGC Filter
C26	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	1st. Video IF Dec.
C27	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AGC Filter
C28	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. Video IF Dec.
C29	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. Video IF Filter
C30	68		47B20680K5						Fixed Trimmer
C31	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	3rd. Video IF Dec.
C32	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	3rd. Video IF Cath.
C33	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	3rd. Video IF Fil.
C34	10		47B20100K5	SI10	D6-100	5W5Q1	GP1K-100	5GA-Q1	Video Det. Filter
C35	.5	100	46A177	P288-5		GT2P5		2TM-P5	AGC Filter
C36	.5	25	46A177	P288-5		GT2P5		2TM-P5	Video Coupling
C37	47		47X20SL470K	SI47N750	TCN-47		N750K-470	5TCU-Q47	Fixed Trimmer
C38	.1	200	46AU104J	P288-1	DF-104	PTE4P1		2TM-P1	Video Coupling
C39	2.2		47A160-4	SI2.2NP0	TCZ-2.2		NP0K-2R2		Sound IF Coupling
C40	47		47X20SL470K	SI47N750	TCN-47		N750K-470	5TCU-Q47	Fixed Trimmer
C41A	4000		47A218	BPD-2X004	D6-402	1D5D4	822-004	5HK-2D4	Sound IF Dec.
B	4000				D6-402	1D5D4			Sound IF Cath.
C42	330		47B20331K5	SI330	D6-331		GP2K-331	5GA-T33	Diode Load
C43	1000		47B20A102M5	SI1000	D6-102	1W5D1	GP2L-102	5HK-D1	De-emphasis
C44	.01	600	46AY103J	P688-01	D6-103	PTE6S1	GP2-333-103	8TM-S1	Audio Coupling
C45	.01	600	46AY103J	P688-01	D6-103	PTE6S1	GP2-333-103	8TM-S1	Audio Coupling

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C46A	.01								Audio Coupling
B	250**				†PC-80				AF Amp. Plate
C									Audio Output Grid
C47	.01	600	46AY103J	P688-01	D6-103	PTE6S1	GP2-333-103	5TM-S1	Audio Output Plate
C48	220	500	47X20B221K	1468-00025	D6-221	5W5T25	GP2K-221	1FM-325	Sync. Coupling
C49	.05	600	46AY503J	P688-05	DF-503	PTE6S5		5TM-S5	Sync. Coupling
C50	.05	600	46AY503J	P688-05	DF-503	PTE6S5		5TM-S5	Sync. Coupling
C51	68		47B20680K5	SI68	D6-680	5W5Q7	GP1K-680	5GA-Q68	Voltage Divider
C52	.5	200	46AT504J	P288-5		GT2P5		5TM-P5	Sync. Clipper Cath.
C53A	.002			P688-002		PTE6D2	GP2-333-202		Vert. Integrator Net
B	.005			P688-005	*PC-100	PTE6D5	GP2-333-502	101C1	Vert. Integrator Net
C	.005			P688-005		PTE6D5	GP2-333-502		Vert. Integrator Net
C54	3900	500		1464-004		1DR5D4			Vert. Osc. Grid Cap ¶ ‡
C55	3900	500		1464-004		1DR5D4			Vert. Osc. Grid Cap †
C56	5000		47A168	BPD-005	DD-503	1D5D5	811-005	5HK-D5	Vert. Hold Bypass
C57	1000		47B20A102M5	SI1000	D6-102	1W5D1	GP2L-102	5HK-D1	Vert. Osc. Plate
C58	.047	600	46BR473L6	P688-047	DF-503	PTE6S5		5TM-S47	Vert. Discharge
C59	.1	600	46AX104J	P688-1	DF-104	PTE6P1		5TM-P1	Vert. Sweep Coup.
C60	.05	600	46AY503J	P688-05	DF-503	PTE6S5		5TM-S5	Fixed Trimmer
C61	.01	600	46AY103J	P688-01	D6-103	PTE6S1	GP2-333-103	5TM-S1	Vert. Sweep Coupling
C62	.01	600	46AY103J	P688-01	D6-103	PTE6S1	GP2-333-103	5TM-S1	Integrator Net
C63	120	500	47X20B121K	1468-00015	D6-121	5W5T15	GP2K-121	1FM-315	Horiz. Sync. Coupling
C64	82	500	47X20B820K	SI82			GP1K-820		Horiz. Sync. Coupling
C65	330	500	47X20B331K	1468-00035	D6-331		GP2K-331	1FM-335	Voltage Divider
C66	.5	200	46AT504J	P288-5		GT2P5		5TM-P5	AFC Filter
C67	.05	600	46AY503J	P688-05	DF-503	PTE6S5		5TM-S1	AFC Filter
C68	.05	600	46AY503J	P688-05	DF-503	PTE6S5		6TM-S1	AFC Plate Bypass
C69	330	500	47X20B331K	1469-00035					Horiz. Osc. Grid Cap
C70	.01	400	46BR103E4	P488-01	D6-103	PTE6S1	GP2-333-103	4TM-S1	Fixed Trimmer
C71	82	500	47X20B820K						Horiz. Osc. Feedback
C72	820	500	47X25B821K						Horiz. Discharge
C73	2500	500		1467-0025	D6-252	1W5D25	GP2-333-252		Horiz. Sweep Coupling ¶
C74	2000	500		1467-002	D6-202	1W5D2	GP2-333-202	1FM-22	Horiz. Sweep Coupling †
C75	.05	600	46AY503J	P688-05	DF-503	PTE6S5		6TM-S5	Horiz. Output Screen
C76	.1	600	46AX104J	P688-1	DF-104	PTE6P1		6TM-P1	Damper Filter
C77	.03	600	46AY303J	P688-03		PTE6S3		6TM-S3	Damper Filter
C78	.03	600	46AY303J	P688-03		PTE6S3		6TM-S3	Horiz. Sweep Coupling
C79	.1	600	46AX104J	P688-1	DF-104	PTE6P1		6TM-P1	Horiz. Sweep Coupling
C80	500	20000	47A233	HV20C	TV3-502				HV Filter
C81	.01	600	46AY103J	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Line Filter
C82	.01	600	46AY103J	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Line Filter
C83	.02	600		P688-02	DF-203	PTE6S2		6TM-S2	AFC Filter
C84	270		47B20A271K5	SI270	D6-271	5W5T3	GP2K-271	5GA-T27	RF Coupling
C85	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Amp. Plate Dec.
C86	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Amp. Screen
C87	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Amp. Cathode
C88	270		47B20A271K5	SI270	D6-271	5W5T3	GP2K-271	5GA-T27	RF Coupling
C89	47		47B20A470K5	SI47	D6-470	5W5Q5	GP1K-470	5GA-Q47	Osc. Grid
C90	.02	600	46AY203J	P688-02	DF-203	PTE6S2		6TM-S2	Osc. Anode Bypass
C91	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass
C92	270		47B20A271K5	SI270	D6-271	5W5T3	GP2K-271	5GA-T47	IF Coupling
C93	5000		47A168	BPD005	DD-502	1D5D5	811-005	5HK-D5	IF Amp. Dec.
C94	5000		47A168	BPD-005	DD-502	1D5D5	811-005	5HK-D5	IF Amp. Screen
C95	10		47B20A100K5	SI10NP0	TC2-10		NP0K-100	5TCC-Q1	Fixed Trimmer
C96A	100			SI100		5W5T1	GP1K-101		Diode RF Filter
B	100			SI100	*PC-50	5W5T1	GP1K-101	*100C1	Diode RF Filter
C97	.05	200	46AU503J	P288-05	DF-503	PTE4S5		6TM-S5	AVC Filter
C98	.1	600	46AX104J	P688-1	DF-104	PTE6P1		6TM-P1	RF Bypass

† Not used in all Models
¶ Some Models may use a 4700 MMF Capacitor in this application
‡ Some Models may use a 6800MMF Capacitor in this application
♦ Items C46A, C46B, C46C, R49A, R49B are combined in one unit
• Items C53A, C53B, C53C, R63A, R63B & R63C are combined in one unit.
* Items C96A, C96B & R107 are combined in one unit
** Items 46B & 46C total capacity equal 250MMF

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	2500Ω	½	25B888		RTV-234	SBB-614-S	Contrast Control -Panel
B	1Meg	½					Volume Control & SW - Rear
R2A	2500Ω	2	25B895		RTV-235		Focus Control - Panel - Wire Wound
B	50KΩ	½					Brightness Control - Rear
R3A	500KΩ	½		Q13-133	AG-60Z	B-60	Vertical Hold Control - See Note 1
B	Shaft			Not Req.	FS-3	Not Req.	Attach to R3A per instructions
R4A	5000Ω	½	25B712	Q11-114	AG-17-S	AN-10	Vertical Linearity
B	Shaft		Not Req.	Not Req.	FKS- 1/4	AK-1	Attach to R4A per instructions
R5	200Ω	2	25B714	W-200	43-200	VK-123	High Voltage Control - Wire Wound
R6A	2.5Meg	½	25B711	Q11-239	AG-84-S	AN-83	Height Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R6A per instructions
R7A	50K	½	25A858	Q11-123	AG-44-S	AN-31	Horiz. Hold Control - See Note 1
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R7A per instructions
R8A	50K	½	25A858	QU-123	AG-44-S	AN-31	Horiz. Drive Control - See Note 2
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R8A per instructions

Note 1 Some Models use a Vertical Hold Control (1Meg) and a Horizontal Hold Control (50KΩ) Dual concentric
Manufacturers Part No. 25B917.
Note 2 Not used in all Models

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE SPECIFIED
R9	3900Ω	½		BTS-3900	RF Amp. Grid
R10	6800Ω	½		BTS-6800	RF Amp. Screen
R11	10000Ω 20%	½		BTS-1000	RF Amp. Plate Decoupling
R12	1000Ω 20%	½		BTS-1000	Decoupling
R13	4700Ω 20%	½		BTS-4700	Mixer Grid
R14	150KΩ 20%	½		BTS-150K	Mixer Grid
R15	22Ω	½			Parasitic Suppressor
R16	10KΩ	½		BTS-10K	Mixer Plate Decoupling
R17	10KΩ	½		BTS-10K	Osc. Grid
R18	1000Ω	½		BTS-1000	Osc. Plate
R19	1000Ω 20%	½		BTS-1000	Decoupling
R20	100Ω 20%	½	23X20X101K	BTS-100	Decoupling

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	IDENTIFICATION CODES
R21	4700Ω	½	23X20X472K	BTS-4700	1st. Video IF Coil Shunt
R23	47Ω	½	23X20X470K		1st. Video IF Amp. Cathode
R23	12KΩ	½	23X20X123K	BTS-12K	Voltage Divider
R24	100Ω	½	23X20X101K	BTS-100	Decoupling
R25	47Ω	½	23X20X470K		2nd. Video IF Amp. Cathode
R26	10KΩ	½	23X20X103K	BTS-10K	Voltage Divider
R27	100Ω 20%	½	23X20X101K	BTS-100	Decoupling
R28	100Ω	½	23X20X101K	BTS-100	Decoupling
R29	150Ω	½	23X20X151K	BTS-150	3rd. Video IF Amp. Cathode
R30	150Ω	½	23X20X151K	BTS-150	AGC Network
R31	150Ω	½	23X20X151K	BTS-150	AGC Network
R32	1Meg 20%	½	23X20X105M	BTS-1Meg	AGC Network
R33	3300Ω	½	23X20X332K*	BTS-3300	Video Detector Diode Load
R34	220KΩ	½	23X20X224M	BTS-220K	Video Amp. Grid
R35	150Ω	½	23X20X151K	BTS-150	Video Amp. Cathode
R36	5600Ω	2	23X40X562K	BTB-5600	Voltage Divider
R37	1500Ω	1	23X30X152K	BTA-1500	Decoupling
R38	10KΩ	½	23X20X103K	BTS-10K	Picture Tube Grid
R39	100KΩ	½	23X20X104M	BTS-100K	Picture Tube Cathode
R40	680Ω	1	23X30X681K	BTA-680	Voltage Divider
R41	4700Ω	½	23X20X472K	BTS-4700	Vertical Retrace Blanking
R42	150Ω	½	23X20X151K	BTS-150	Sound IF Amp. Cathode
R43	22KΩ	½	23X20X223K	BTS-22K	Sound IF Amp Decoupling
R44	10KΩ	½	23X20X103K	BTS-10K	Ratio Detector Diode Load
R45	10KΩ	½	23X20X103K	BTS-10K	Ratio Detector Diode Load
R46	270Ω	½	23X20X271K	BTS-270	Balancing
R47	33KΩ	½	23X20X333K	BTS-33K	De-Emphasis
R48	6.8Meg	½	23X20X685K	BTS-6.8Meg	AF Amp. Grid See Note 2
R49A	500KΩ	½	†	BTS-500K	AF Amp. Plate
B	500KΩ	½	‡	BTS-500K	Output Grid
R50	270Ω	1	23X30X271K	BTA-270	Output Cathode
R51	15KΩ	10	24A922	1 3/4A-15K	Voltage Divider - Wire Wound
R52	10KΩ	½	23X20X103K	BTS-10K	Isolation
R53	220KΩ	1	23X20X224M	BTA-220K	Isolation
R54	2.2Meg	½	23X20X225M	BTS-2.2Meg	Sync. Separator Grid
R55	39KΩ	½		BTS-39K	Sync. Separator Plate - See Note 3
R56	270KΩ	½	23X20X274M	BTS-270K	Sync. Amp. Cathode
R57	820KΩ	½	23X20X824M	BTS-820K	Sync. Amp. Plate
R58	6800Ω	½	23X20X682K	BTS-6800	Voltage Divider
R59	47KΩ	½	23X20X473K	BTS-47K	Voltage Divider
R60	39KΩ	½		BTS-39K	Sync. Clipper Grid - See Note 3
R61	4700Ω	½	23X20X472K	BTS-4700	Sync. Clipper Cathode
R62	2200Ω	½	23X20X222K	BTS-2200	Sync. Clipper Plate
R63A	22KΩ	½		BTS-22K	Integrator Network
B	8200Ω	½		BTS-8200	Integrator Network
C	8200Ω	½		BTS-8200	Integrator Network
R64	1Meg 20%	½	23X20X105M	BTS-1Meg	Vertical Osc. Grid
R65	1Meg 20%	½	23X30X105M	BTA-1Meg	Vertical Osc. Plate
R66	1Meg 20%	½	23X20X105M	BTS-1Meg	Vertical Output Grid
R67	8200Ω	½	23X20X822K	BTS-8200	Vertical Peaking
R68	1000Ω	½		BTB-1000	Vertical Output Cathode
R69	330KΩ	½	23X20X334M	BTS-330K	Horizontal AFC Grid
C70	82KΩ	1	23X30X823K	BTA-82K	Horizontal Cathode - See Note 6
R71	68KΩ	½	23X20X683K	BTS-68K	Horizontal AFC Plate
R72	120KΩ	½	23X30X124M	BTA-120K	Voltage Divider
R73	150KΩ	½	23X20X154M	BTS-150K	Horizontal Osc. Grid
R74	820K 20%	½	23X20X824M	BTS-820K	Horizontal AFC Filter
R75	330KΩ 20%	½	23X20X334M	BTS-330K	Horizontal AFC Filter - See Note 5
R76	3900Ω	½	23X20X392K	BTS-3900	Horizontal AFC Filter
R77	12KΩ	½	23X30X123K	BTS-12K	Voltage Divider - See Note 1
R78	8200Ω	½	23X20X822K	BTS-8200	Horizontal Osc. Coil Shunt
R79	47KΩ	1	23X30X473K	BTA-47K	Horizontal Osc. Plate - See Note 6
R80	47KΩ	½	23X20X473K	BTS-47K	Horizontal Osc. Plate Decoupling - See Note 1
R81	47Ω	½	23X20X470K		Parasitic Suppressor
R82	470KΩ 20%	½	23X20X474M	BTS-470K	Horizontal Output Grid
R83	220Ω	1	24A925-5	1 3/4A-225	Horizontal Output Cathode -Wire Wound
R84	15KΩ	2	23X40X153K	BTB-15K	Horizontal Output Screen
R85	3.3Ω	1	23X20X033K		H.V. Filament
R86	1Meg 20%	1	23X30X105M		H.V. Filter
R87	750Ω	10	24A920	1 3/4A-750	Filter - Wire Wound
R88	2200Ω	1	23X30X222K	BTA-2200	Voltage Divider
R89	150KΩ 20%	½	23X20X154M	BTS-150K	Fuse Shunt
R90	1000Ω	5	24A921	1 3/4A-1000	Voltage Dropping - Wire Wound
R91	1000Ω	5	24A921	1 3/4A-1000	Voltage Dropping - Wire Woun d
R92	220Ω	20			Voltage Dropping - Wire Wound See Note 1
R93	330KΩ 20%	½	23X20X334M	BTS-330K	Horiz. Feedback Network
R94	2200Ω	½	23X20X222K	BTS-2200	Sync. Clipper Plate
R95	2.2Meg 20%	½	23X20 X225M	BTS-2.2Meg	AM RF Amp. Grid
R96	68Ω	½	23X20X680K		AM RF Amp. Cathode
R97	47KΩ 20%	½	23X20X473K	BTS-47K	AM RF Amp. Screen - See Note 4
R98	8200Ω 20%	½	23X20X822K	BTS-8200	AM RF Amp. Plate
R99	1000Ω	½	23X20X102K	BTS-1000	AM RF Amp. Decoupling
R100	1Meg	½	23X20X105M	BTS-1Meg	Mixer Grid
R101	22KΩ	½	23X20X223K	BTS-22K	Oscillator Grid
R102	27KΩ	1	23X30X273K	BTA-27K	Oscillator Anode
R103	2.2Meg 20%	½	23X20X225M	BTS-2.2Meg	AM IF Amp. Grid
R104	68Ω	½	23X20X680K		AM IF Amp. Cathode
R105	47KΩ 20%	½	23X20X473K	BTS-47K	AM IF Amp. Screen - See Note 4
R106	1000Ω	½	23X20X102K	BTS-1000	AM IF Amp. Decoupling
R107	47KΩ	½	*	BTS-47K	Diode RF Filter
R108	1Meg 20%	½	23X20X105M	BTS-1Meg	AVC Network
R109	470K 20%	½	23X20X474M	BTS-470K	AVC Network

† Items R49A, R49B, C46A, C46B, C46C are combined in one unit
♦ Items R63A, R63B, R63C, C53A, C53B, C53C are combined in one unit
* Items R107, C96A, C96B, are combined in one unit
Note 1 Not used in all Models
Note 2 Some Models use 10 Meg Resistor in this application
Note 3 Some Models use 47KΩ Resistor in this application
Note 4 Some Models use 56KΩ Resistor in this application
Note 5 Some Models use 330KΩ 1 Watt Resistor in this application
Note 6 Some Models use Resistors in parallel to obtain desired value

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	780VCT	5VAC	6.3VAC	52C204(A)①	P-8162	P-3071	
	⑤ 1.5A	④ .190A	⑤ 3A	⑤ 9.8A				
T2	117VAC	400VCT	6.3VAC		52C204(B)①		P-3148 ②	
	⑤ .5A	⑤ .080A	1.2A					

① Some Models use larger Transformer in place of T1 and T2.
② Drill New Mounting Holes

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T3	190Ω	1.4KΩ	55C115	A-8111	A-3000		Vert. Osc. Trans.
T4	162Ω	32Ω	55C149		HVO-6		Horiz. Output Trans.
	Tapped ② 14Ω	Tapped ② 8.5Ω &29Ω					
T5	1.6KΩ		55B151		A-3039		Vert. Output Trans.
	Tapped ② 4Ω						
T6A	18Ω		53C197-B	DY-9	MDF-70		Horiz. Deflection Coils
B	48Ω						Vert. Deflection Coils
T7	1000Ω		51A1287				Focus Coil

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T8	4.1KΩ	3.6Ω	280Ω	.5Ω	55B150	A-3877③	A-2930	RO-9	③ Use Mounting Slots Provided

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA Hallicrafters PART No.	VIKING PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V.C. IMP.				
SP1	PM	3.6Ω	85D107	12J12	12A4A	
	CONE DIA.	V.C. DIA.				
SP2	11½"	1"				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~V)	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.190A	85Ω	1.3H	56C116	C-1411②	C-2994③	TR-3300③	② Drill one New Mounting Hole

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	REPLACEMENT DATA IRC PART No.	NOTES
L2A	Ant. Trans.	.9Ω	.6Ω			
L2B	Ant. Trans.	.9Ω	.6Ω			
L3	Ant. Coupling	.6Ω				
L4	RF Choke	0Ω				
L5	Ant. Coupling					Not used in all Models
L6	Ant. Coupling					Not used in all Models
L7	Ant. Coil	.6Ω				Channel 2
L8	Ant. Coil	0Ω				
L9	RF Coil	.1Ω				
L10	RF Choke	.3Ω				
L11	RF Mixer Grid	.9Ω	.6Ω			Channel 2
L12	Mixer Grid	0Ω				
L13	Osc. Coil	.2Ω				Channel 2
L14	Osc. Coil	0Ω				
L15	RF Choke	.6Ω				Wound on 10K Resistor
L16	Fil. Choke	0Ω				
L17	1st. Video IF	.1Ω	.1Ω	50B471-C		
L18	2nd. Video IF	.2Ω	.8Ω	50A475		
L19	Fil. Choke	0Ω		53A200		
L20	3rd. Video IF	.2Ω	.2Ω	50A476-E		Includes Trap
L21	4th. Video IF	.5Ω	.5Ω	50A477		
L22	Peaking Coil	8.5Ω		51A1256		Wound on 6800Ω Resistor
L23	Peaking Coil	10.5Ω		51A1260		Wound on 2200Ω Resistor
L24	Peaking Coil	11Ω		51A1257		Wound on 15K Resistor
L25	4.5MC Trap	1.2Ω		50A474-G		
L26	Peaking Coil	19Ω		51A1259		Wound on 2200Ω Resistor
L27	1st. Sound IF	1.2Ω		50A474-G		
L28	Ratio Det. Trans.	4.2Ω	.8Ω	50B473-D		Tap at .8Ω
L29	Horiz. Osc.	75Ω	45Ω	51B1242		
L30	Width Coil	23Ω		51A1243-C		
L31	Horiz. Lin.	5.6Ω		51A1243-C		Tap at 1.5Ω
L32	Loop Ant.	1.4Ω		57C146		
L33	455KC Trap	52Ω		53A198		
L34	Osc. Coil	6.2Ω		51A1245		
L35	Input IF	15Ω	15Ω	50A472		
L36	Output IF	15Ω	15Ω	50A472		

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			Hallicrafters PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG Slo-Blo	.250A	39A344		315.250		

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	Hallicrafters PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		GC-AG-J	G-AG	WC36B	A56U	43	0-2 or S-2	

ASTATIC, SHURE, AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA		REMARKS
	Hallicrafters PART No.	WALCO PART No.	
M3		W-2AGS	

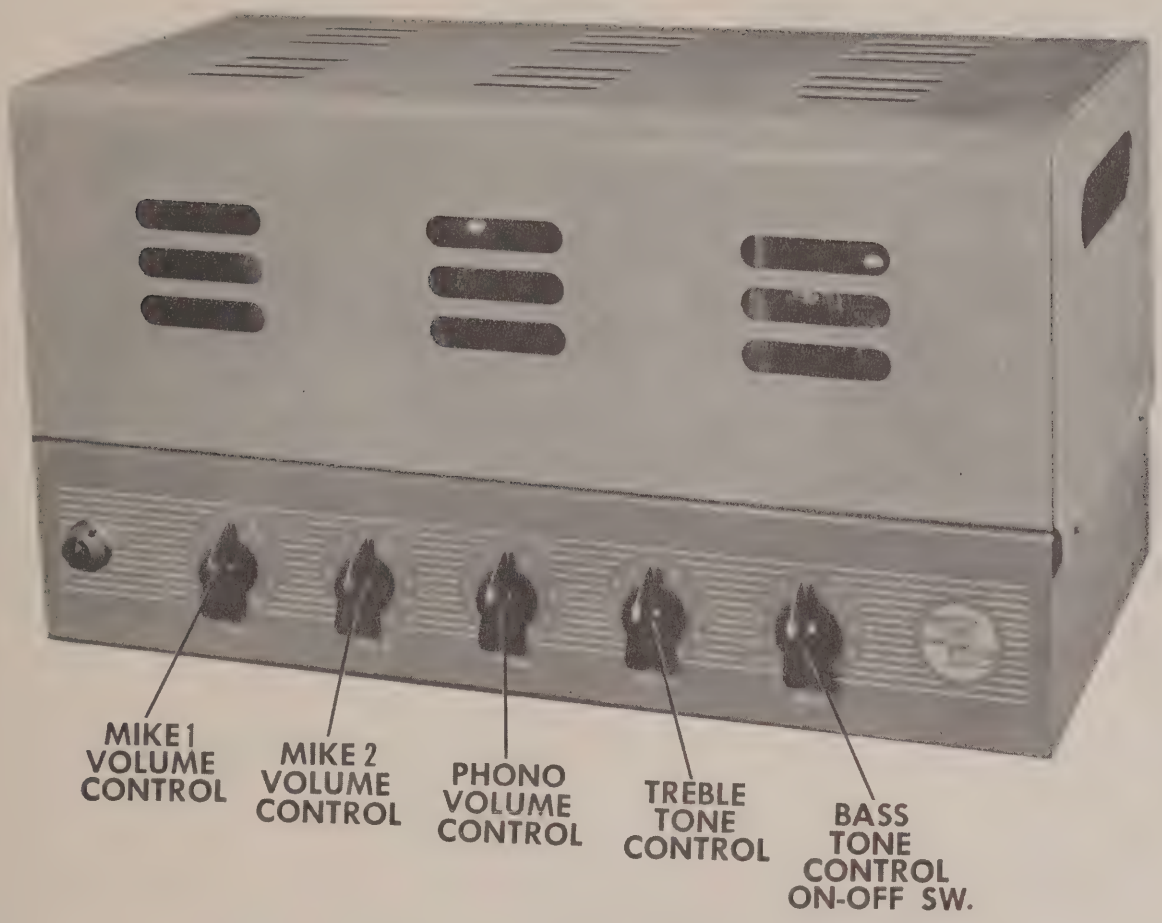
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTE
					Hallicrafters PART No.		
M4	Bayonet	6-8	.15	Brown	39A004		Type Number 47.
M5	Bayonet	6-8	.15	Brown	39A004		Type Number 47
M6	Bayonet	6-8	.15	Brown	39A004		Type Number 47

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M7	RF Tuner	1D961-X3	Complete
M8	Crystal	19A1246	1N60
M9	Switch	60B401	Function (AM-TV-Phono)
M10	Ion Trap	21A101-B	
M11	Tuning Cap	48C241	(20-459MMF, 31-184MMF)
B2	Trimmer	44A391	7-100MMF (Horiz. Lock)
A34	Trimmer	44A392	455MC Trap
	Knob	15B234	Off/On-Volume, Brightness and Vert. Hold (Models 20990S & 20994)
	Knob	15B269	Contrast, Focus and Horiz. Hold (Models 20990S, 20994)
	Knob	15D293-C	Channel Selector (Models 20990S, 20994)
	Knob	15B271	AM Tuning (Models 20990S, 20994)
	Knob	15A299	Fine Tuning(Models 20990S, 20994)
	Knob	15C295	AM-TV Phono (Models 20990S, 20994)
	Knob	15A243	Off/On Volume, Brightness & Vert. Hold (Model 20990)
	Knob	15A276	C ontrast, Focus & Horiz. Hold (Model 20990)
	Knob	15A294	Channel Selector (Model 20990)
	Knob	15A279	AM Tuning (Model 20990)
	Knob	15A300	Fine Tuning (Model 20990)
	Knob	15A296	AM-TV-Phono (Model 20990)

MASCO
MODELS ME-36, ME-36R



MASCO
MODELS ME-36, ME-36R.

TRADE NAME	Masco, Models ME-36, ME-36R
MANUFACTURER	Mark Simpson Mfg. Co, Inc., 32-28 49th St, Long Island City, New York
TYPE SET	AC Operated Audio Amplifier (Model ME-36R includes phono Player)
TUBES (SEVEN)	Types 6SC7 Mic. 1 and 2 Pre Amp., 6SJ7 1st AF Amp., 6SJ7 2nd AF Amp., 6SN7GT 3rd AF - Phase Inv., (2) 6L6G Power Output, 5U4G Rectifier
POWER SUPPLY	110-120 Volts AC Rating 1.3 Amp. at 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	Mic. 1 and Mic. 2 Pre-Amplifier	6SC7	6SC7	8S	
V2	1st. AF Amplifier	6SJ7	6SJ7	8N	
V3	2nd. AF Amplifier	6SJ7	6SJ7	8N	
V4	3rd. AF Amplifier-Phase Inverter	6SN7GT	6SN7GT	8BD	
V5	Power Output	6L6G	6L6G	7AC	
V6	Power Output	6L6G	6L6G	7AC	
V7	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MASCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	16	600		GL600/16		KR616X		AP-16	Filter
C2A	10	450		AFH4-10		UPT111145		TVL-4760	▲ Decoupling
B	10	450							■ Decoupling
C	10	450							▲ Decoupling
D	10	450							Power Output Screen
C3	50	50		PRS50/50		BR505		TVA-1308	Power Output Cathode
C4	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Coupling
C5	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Coupling
C6	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Audio Coupling
C7	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Audio Coupling
C8	.1	600		P688-1	DF-104	PTE6P1		6TM-P1	1st. AF Amp. Screen
C9	.05	600		P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C10	470			SI470	D6-471	5W5T5	GP2K-471	5GA-T47	Tone Comp. †
C11	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Tone Comp.
C12	470			SI470	D6-471	5W5T5	GP2K-471	5GA-T47	Tone Comp. †.
C13	.05	600		P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C14	.05	600		P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C15	.05	600		P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C16	.1	600		P688-1	DF-104	PTE6P1		6TM-P1	Line Filter
C17	220	*		SI220	D6-221	5W5T25	GP2K-221	5GA-T22	Output Grid *

† Some models use .0005 MFD. in this application.
* Not used in all models.

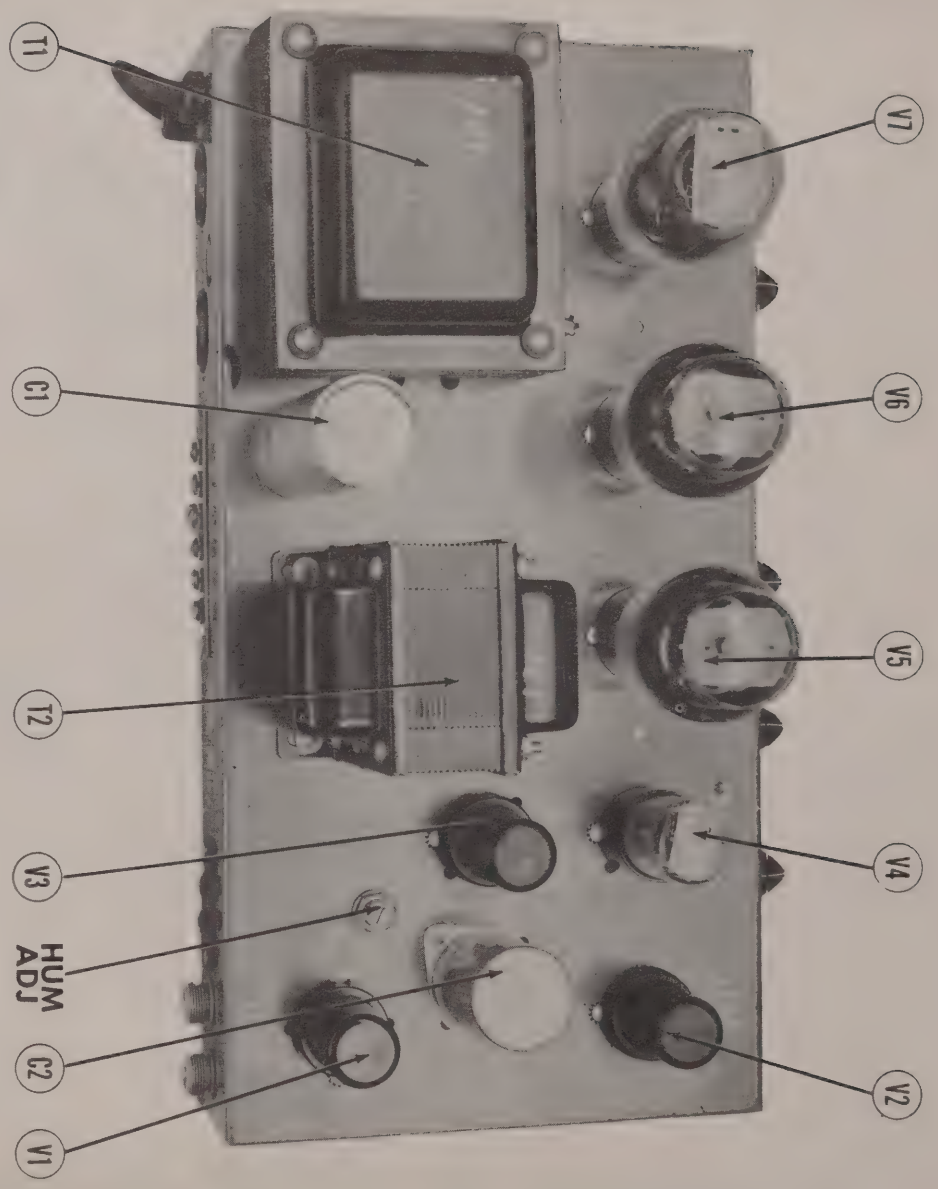
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	34-011-182	Q13-133	AG-60-Z	B-60-S	Bass Tone Control
B	Shaft		Not req.	Not req.	RS-2	Not req.	Attach to R1A per instructions
C	Switch		Not req.	76-1	SWB	Not req.	Attach to R1A per instructions
R2A	500KΩ	½	33-010-188	Q13-133	AG-60-Z	B-60	Treble Tone Control
B	Shaft		Not req.	Not req.	RS-2	Not req.	Attach to R2A per instructions
R3A	500KΩ	½	33-010-188	Q13-133	AG-60-Z	B-60	Phono Volume Control
B	Shaft		Not req.	Not req.	RS-2	Not req.	Attach to R4A per instructions
R4A	500KΩ	½	33-010-188	Q13-133	AG-60-Z	B-60	Mike 2 Volume Control
B	Shaft		Not req.	Not req.	RS-2	Not req.	Attach to R4A per instructions
R5A	500KΩ	½	33-010-188	Q13-133	AG-60-Z	B-60	Mike 1 Volume Control
B	Shaft		Not req.	Not req.	RS-2	Not req.	Attach to R5A per instructions
R6	50Ω	2		W-50	43-50	VK-116	Hum Control - Wire Wound

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	IDENTIFICATION CODES
R7	5.6Meg	½		BTS-5.6Meg	Mike 1 Pre-Amp. Grid
R8	270KΩ	½		BTS-270K	Mike 1 Pre-Amp. Plate
R9	5.6Meg	½		BTS-5.6Meg	Mike 2 Pre-Amp. Grid
R10	270KΩ	½		BTS-270K	Mike 2 Pre-Amp. Plate
R11	270KΩ	½		BTS-270K	1st. AF Amp. Grid
R12	270KΩ	½		BTS-270K	1st. AF Amp. Grid
R13	270KΩ	½		BTS-270K	1st. AF Amp. Grid
R14	1000Ω	½		BTS-1000	1st. AF Amp. Cathode
R15	270KΩ	½		BTS-270K	1st. AF Amp. Screen

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
R16	100KΩ	½		BTS-100K	1st. AF Amp. Plate
R17	270KΩ	½		BTS-270K	Tone Compensation
R18	27KΩ	½		BTS-27K	2nd. AF Amp. Grid
R19	47KΩ	½		BTS-47K	Decoupling
R20	12KΩ	½		BTS-12K	Decoupling
R21	2200Ω	½		BTS-2200	2nd. AF Amp. Cathode
R22	47KΩ	½		BTS-47K	2nd. AF Amp. Plate
R23	1000Ω	½		BTS-1000	3rd. AF Amp. and Phase Inverter Cathode
R24	470KΩ	½		BTS-470K	3rd. AF Amp. Grid
R25	100KΩ	½		BTS-100K	3rd. AF Amp. Plate
R26	18KΩ	½		BTS-18K	Phase Inverter Grid - See Note 1
R27	100KΩ	½		BTS-100K	Phase Inverter Plate
R28	270KΩ	½		BTS-270K	Output Grid
R29	270KΩ	½		BTS-270K	Output Grid
R30	200Ω	10		1 3/4A-200	Output Cathode - Wire Wound
R31	2500Ω	10		1 3/4A-2500	Output Screen - Wire Wound
R32	12KΩ	1		BTA-12K	Voltage Divider
R33	20KΩ	20		2D-20K	Bleeder - Wire Wound - See Note 2
R34	270KΩ	½		BTS-270	Feedback

Note 1 Some models use 22KΩ resistor in this application.
Note 2 Some models use 10KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MASCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @1.3A	720VCT 150ADC	5VAC @ 3A	6.3VAC @ 3.7A	A-35	PM-8412 ②	P-2955 ②	PH-145

② Add series resistor to reduce plate voltage

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	10KΩ CT	2Ω 4Ω 8Ω 15Ω 500Ω	240Ω CT	.4Ω .5Ω .7Ω .9Ω 21Ω	O-25	A-3331 ①		PCO-150 ①	① Drill new mounting holes.

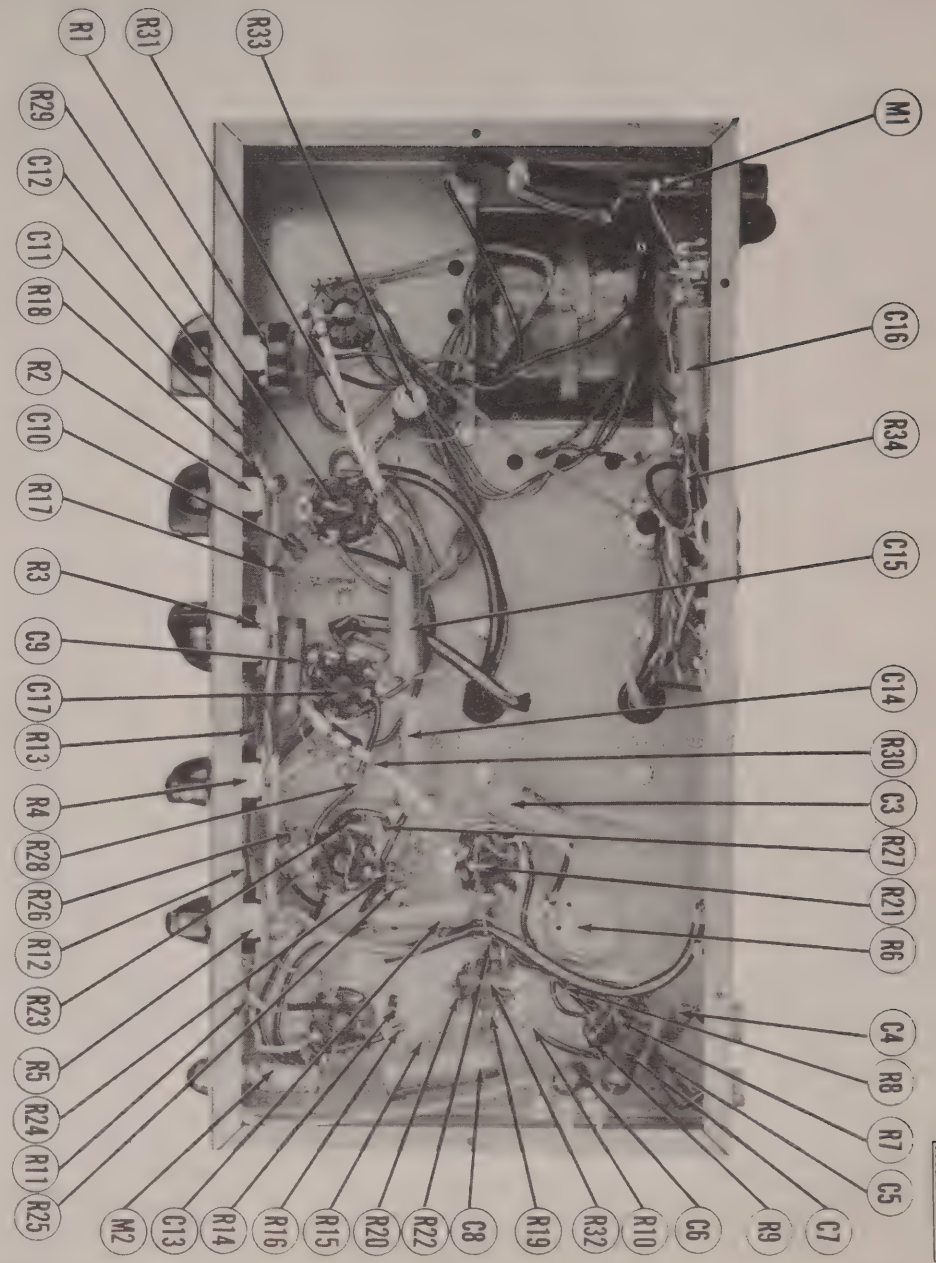
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			MASCO PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG	3A			312003	341001	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					MASCO PART No.		
M2	Bayonet	6-8	.15	Brown			Type # 47

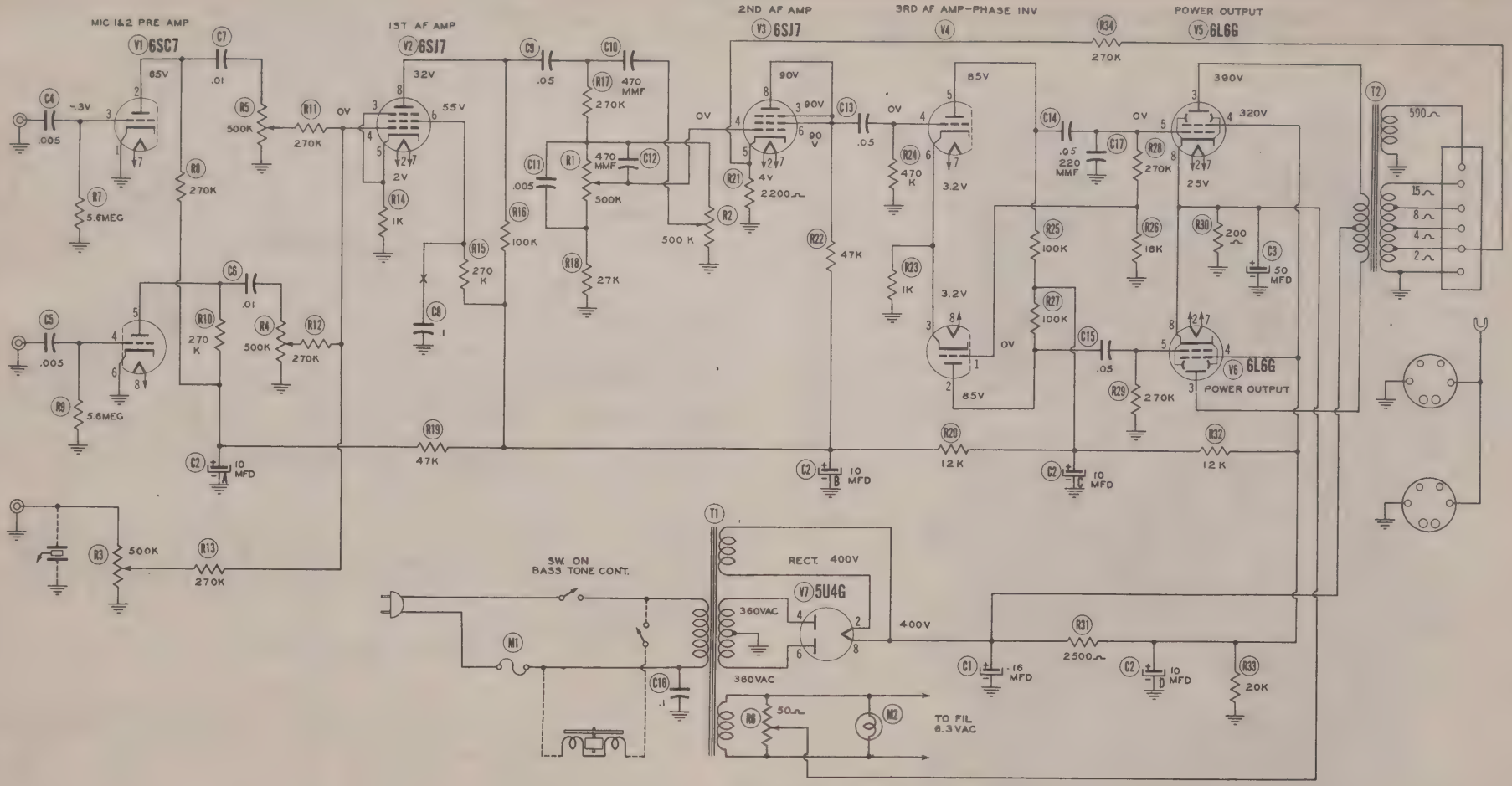
CHASSIS—BOTTOM VIEW



SET 154 FOLDER 7

MASCO MODEL ME-36

MASCO MODEL ME-36



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SC7	0Ω	†32KΩ	6Meg	6Meg	†32KΩ	0Ω	220Ω	220Ω
V 2	6SJ7	0Ω	220Ω	1KΩ	100KΩ	1KΩ	†280KΩ	220Ω	†130KΩ
V 3	6SJ7	0Ω	220Ω	†80KΩ	35KΩ	2.2KΩ	†80KΩ	220Ω	†80KΩ
V 4	6SN7GT	18KΩ	†130KΩ	1KΩ	470KΩ	†130KΩ	1KΩ	220Ω	220Ω
V 5	6L6G	0Ω	220Ω	†110Ω	†2500Ω	270KΩ	†130KΩ	220Ω	200Ω
V 6	6L6G	0Ω	220Ω	†120Ω	†2500Ω	270KΩ	Inf.	220Ω	200Ω
V 7	5U4G	Inf.	20KΩ	Inf.	50Ω	20KΩ	42Ω	Inf.	20KΩ

† MEASURED FROM PIN 8 OF V7

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC voltages measurements are at 20,000 ohms per volt; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15 % in voltage and resistance measurements.
6. All controls at minimum, proper output load connected.

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MODEL T16–M

MITCHELL MODELS
T16-B, -M, T-16-2KB, T-16-2KM, T17-B, -M

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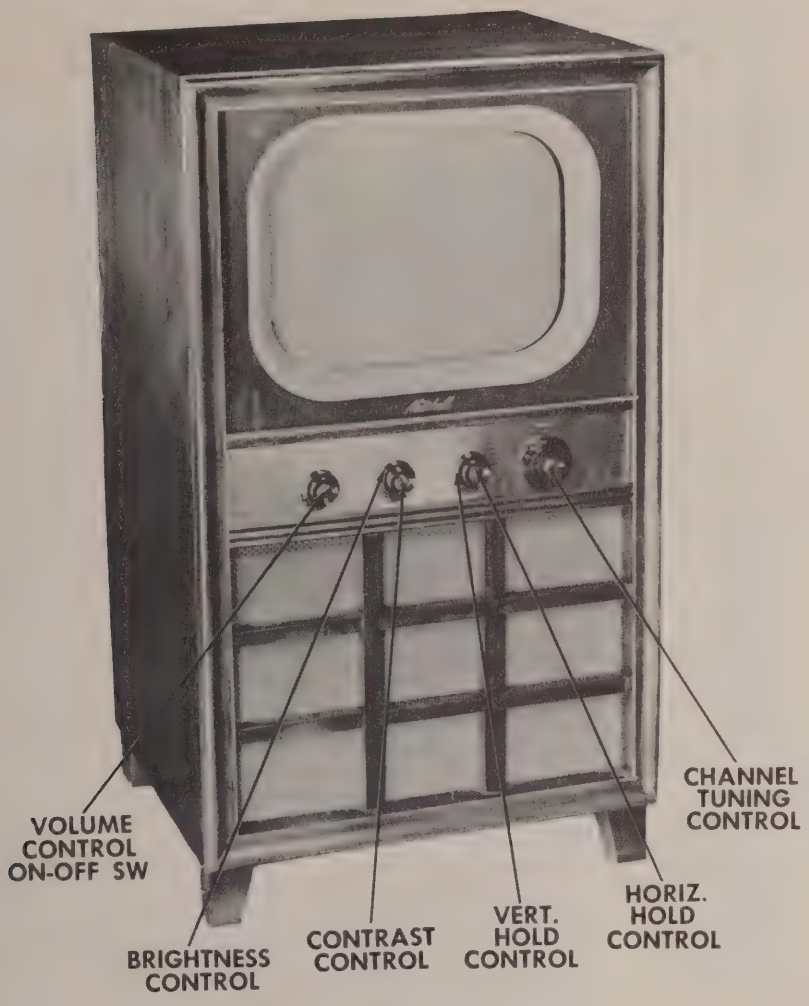
DATE 12–51 SET 154 FOLDER 8

MITCHELL MODELS
T16-B, -M, T-16-2KB, T-16-2KM, T17-B, -M



MITCHELL MODEL T16-M

TRADE NAME	Mitchell Models T16-B, -M, T16-2KB, T16-2KM, T17-B, -M
MANUFACTURER	Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Illinois.
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC - 60 Cycle — RATING 1.82 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

INDEX

Alignment Instructions 6
Disassembly Instructions 10
Horizontal Sweep Circuit Adjustments 10
Parts List and Descriptions 12, 13, 15
Photographs
Cabinet - Rear View 10
Capacitor and Alignment Identifications 4, 9
Photographs (cont.)
Chassis - Top View 3
RF Tuner 7
Resistor and Inductor Identification 11, 14
Resistance Measurements 8
Schematic 2
Tube Placement Charts 5

MITCHELL MODELS
T16-B, -M, T-16-2KB, T-16-2KM, T17-B, -M

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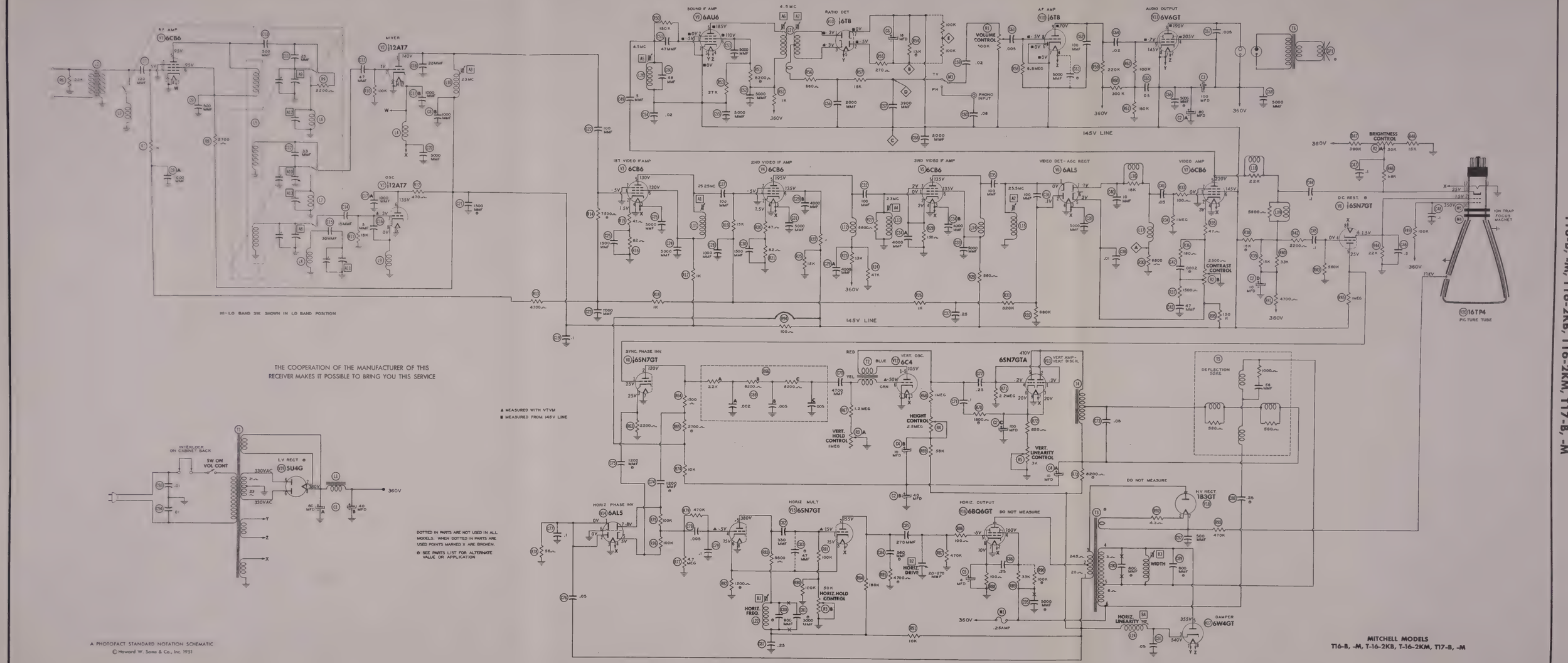
MITCHELL MODELS
T16-B, -M, T16-2KB, T16-2KM, T17-B, -M
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A MEASURED WITH VTVM
■ MEASURED FROM 145V LINE
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
HI-LO BAND SW. SHOWN IN LO BAND POSITION
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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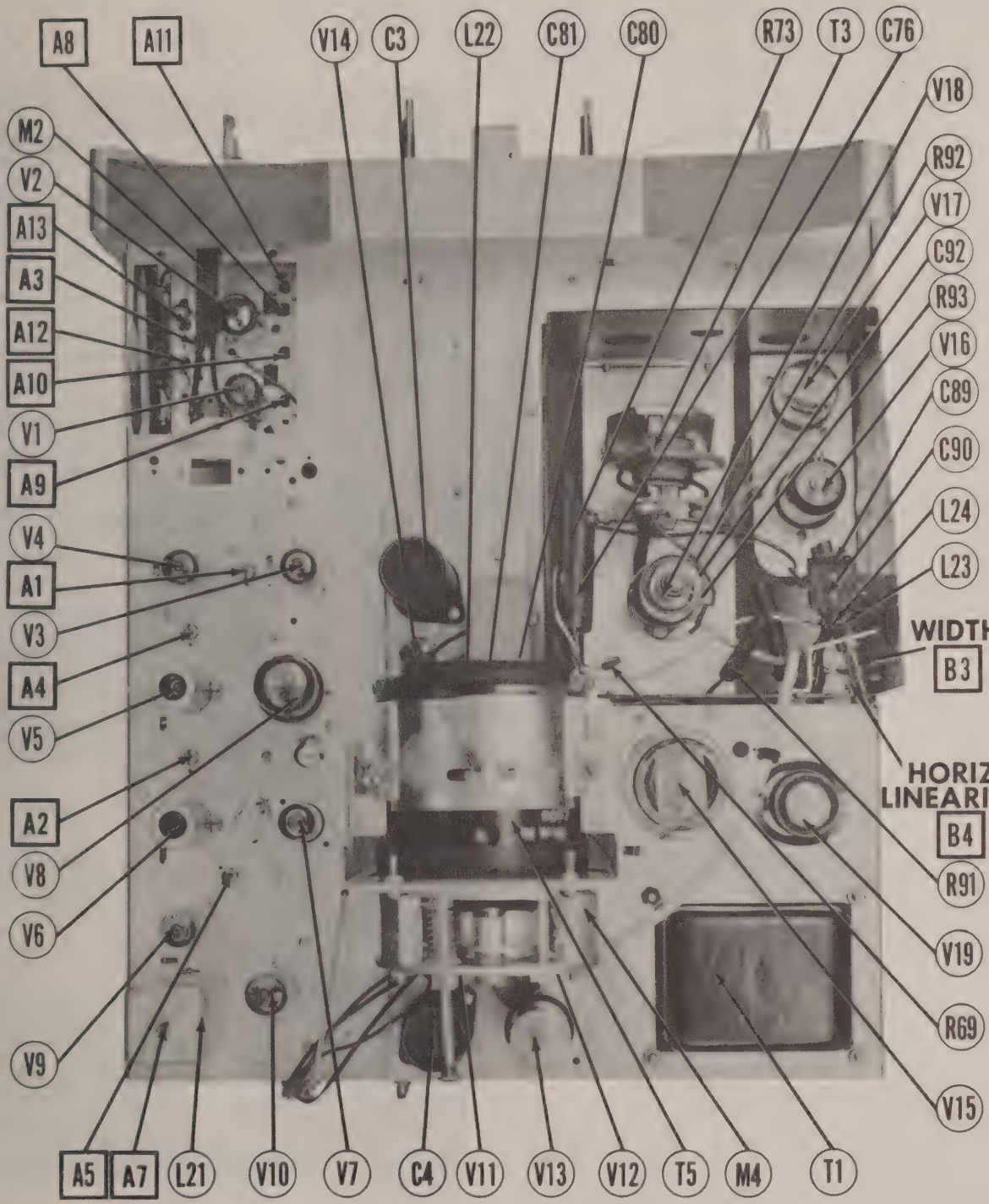
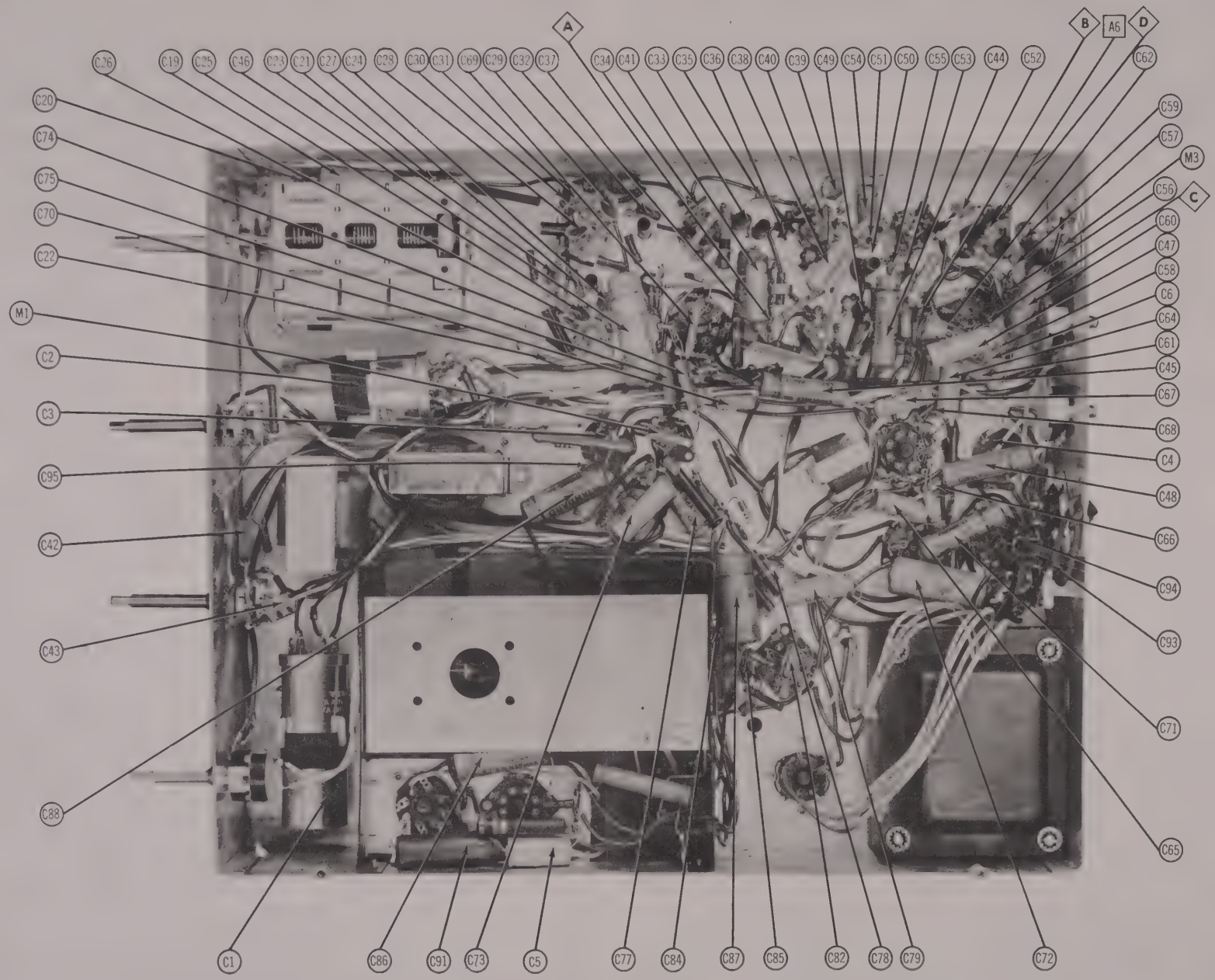
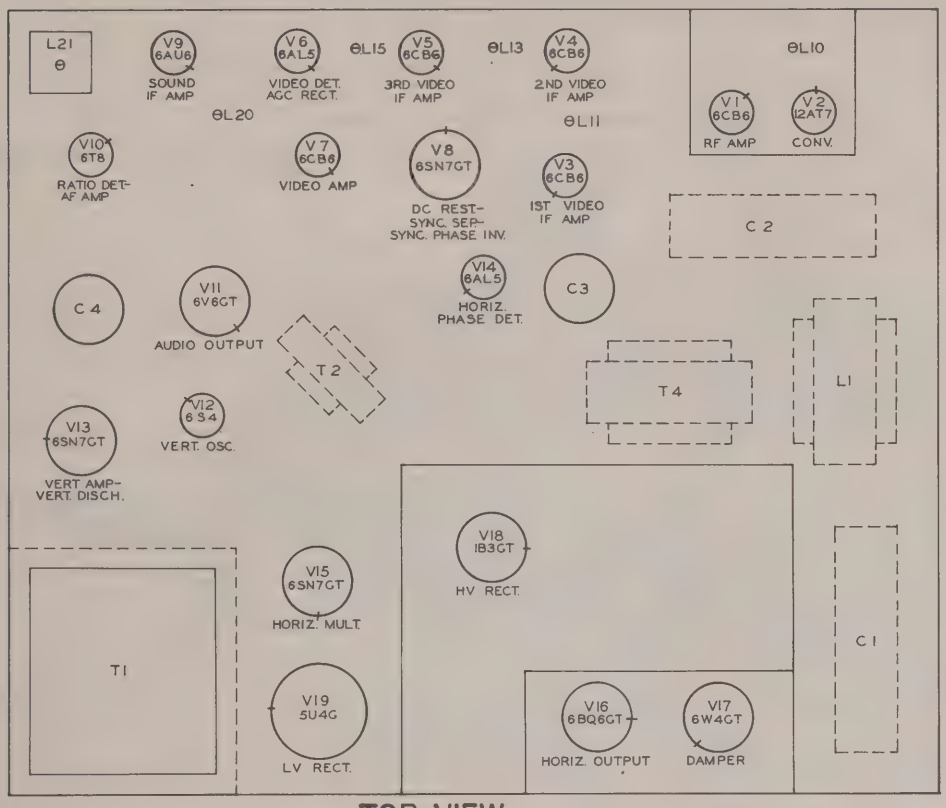
RF AMP V1 6CB6
MIXER V2 12AT7
OSC V3 12AT7
SOUND IF AMP V9 6AU6
4.5 MC
RATIO DET V10 6T8
AF AMP V10 6T8
AUDIO OUTPUT V11 6V6GT
VOLUME CONTROL 500K
PHONO INPUT
145V LINE
1ST VIDEO IF AMP V3 6CB6
2ND VIDEO IF AMP V4 6CB6
3RD VIDEO IF AMP V5 6CB6
VIDEO DET - AGC RECT V6 6AL5
VIDEO AMP V7 6CB6
BRIGHTNESS CONTROL 50K
DC REST. ⊖ V8 6SN7GT
CONTRAST CONTROL 2500
ION TRAP FOCUS MAGNET
V20 16TP4 PICTURE TUBE
SYNC. PHASE INV V16 6SN7GT
VERT. OSC. V17 6C4
VERT. HOLD CONTROL 1MEG
HEIGHT CONTROL 2.5MEG
6SN7GTA
VERT. AMP., VERT. DISCH. V13
VERT. LINEARITY CONTROL 3K
DEFLECTION YOKE
DO NOT MEASURE
HORIZ. PHASE INV V14 6AL5
HORIZ. MULT V15 6SN7GT
HORIZ. OUTPUT V18 6BQ6GT
HORIZ. FREQ.
HORIZ. HOLD CONTROL 50K
HORIZ. DRIVE
WIDTH
HORIZ. LINEARITY
DAMPER V17 6W4GT
RV RECT 1B3GT
INTERLOCK ON CABINET BACK
SW ON VOL CONT
LV RECT ⊖ V19 5U4G
330VAC
360V
145V
355V
540V
MITCHELL MODELS
T16-B, -M, T-16-2KB, T-16-2KM, T17-B, -M



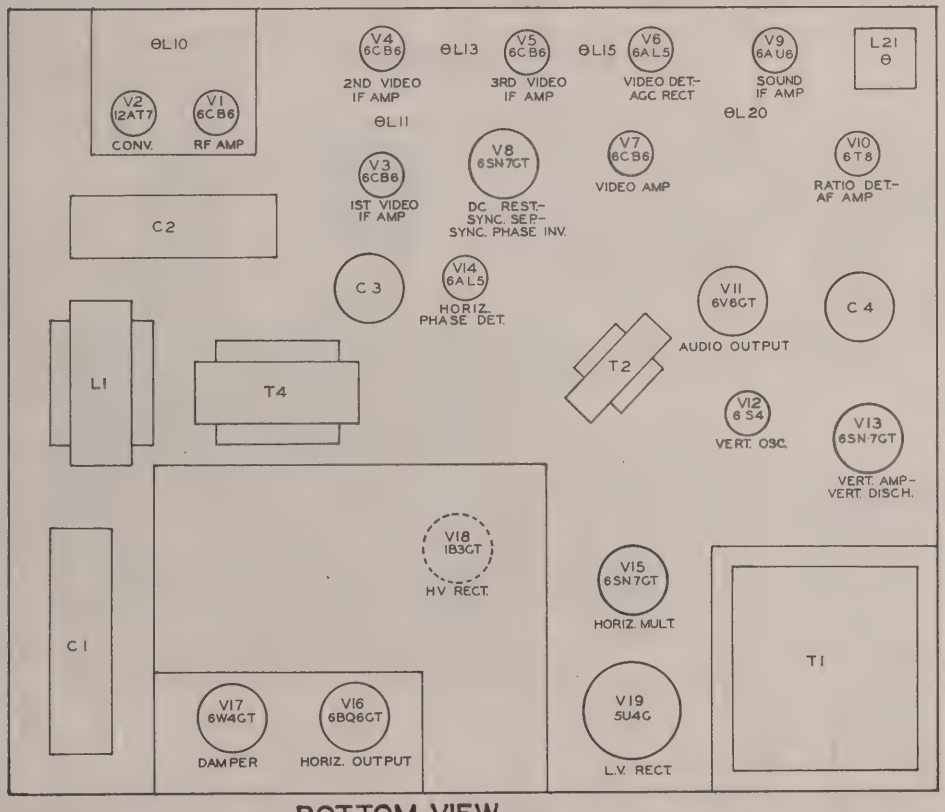
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



TOP VIEW



BOTTOM VIEW

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminatedby removing the horizonal oscillator tube, (V15) from its socket.

VIDEO IF ALIGNMENT

Turn the tuning control to a point which causes no spurious interference . To check for interference turn the tuning control slightly, if the meter reading changes tune to another position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube, (V2). Low side to chassis	25.5 MC (unmod.)	Point of non interference. (See note above)	DC probe to point (A). Common to chassis.	A1, A2	Adjust for max. deflection. Attenuate signal gen. to maintain 1 volt reading.
2.	"	"	23 MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Turn the tuning control to a position which causes no interference with the response curve. To check for interference turn the tuning control slightly., if the response changes, tune to another position.
Connect the synchronized sweep voltage from the sugnal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	24MC (10MC Swp.	22.8 MC 26.1 MC	Point of non-interference	Vert. Amp. to point (A). Low side to chassis.		Check for response curve similar to fig 1. If necessary retouch A1 through A4 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors between alignment points B and C . The junction of these resistors is alignment point E as shown on the schematic. During sound alignment the common lead of the VTVM is connected to approximately 145 volts with respect to chassis. Avoid touching or grounding the VTVM case.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.005mfd.	High side to pin 1, (grid) of 6CB6 (V7) Low side to chassis.	4.5MC (unmod)	Any channel not used locally	DC probe to point (B). Common to point (C).	A5, A6	Adjust for maximum deflection
5.	"	"	"	"	DC probe to point (D). Common to point (E).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.005 MFD	High side to pin 1 (grid) of 6CB6, (V7). Low side to chassis.	4.5 MC (450 KC Swp.)	4.5 MC	Any channel not used locally.	Vert. Amp. to point (B). Low side to chassis.	A5, A6	Disconnect stabilizing capacitor C6. Adjust for maximum aplitude and symmetry as per fig. 2
5.	"	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A7	Reconnect capacitor C6. Adjust A7 so 4.5 MC occurs at center of crossover lines as per fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

TUNER ALIGNMENT

Replace the tuning knobs . Make a pencil mark onthe chassis directly over the tuning shaft to use as an index.
Connect the synchronized sweep voltage from the signal generator to the hori zontal input of the oscilloscope for the horizontal deflection.
The sweep generator output lead should be terminated with its Characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	85 MC (10mc Swp.)	83.25 MC 87.75 MC	6	Vert. amp. to point (A) Low side to chassis.	A8, A9 A10	Adjust A8 to place videomarker at 60% on response curve as shown in fig. 4. Adjust A9 and A10 for maximum amplitude of response with band width shown in fig. 4.
7.	"	"	57 MC (10mc Swp)	55.25 MC 59.75 MC	2	"	"	Check to see if video marker can be properly placed with the tuning control near the center of channel 2. If not make compromise adjustment at A8.
8.	"	"	213 MC (10mc Swp.)	211.25 MC 215.75 MC	13	"	A11, A12 A13	Adjust all to place video markerat 60% on response curve as shown in fig. 4. Adjust A12 and A13 for maximum amplitude of response curve.
9.	"	"	177 MC (10mc Swp.)	175.25 MC 179.75 MC	7	"		Check to see if the video marker can be properly placed with the tuning control near the center of channel 7. If not make compromise adjustment of all.

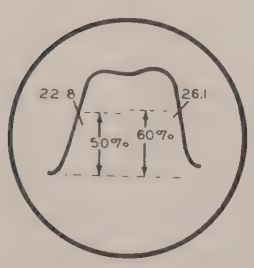


FIG.1

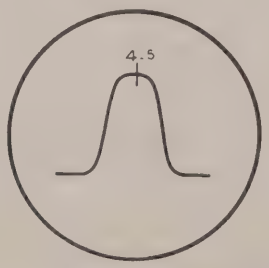


FIG. 2

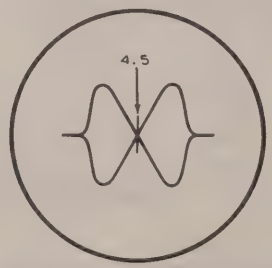


FIG. 3

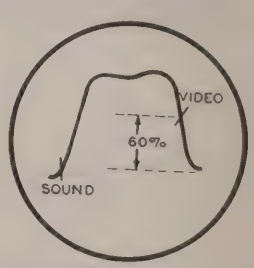
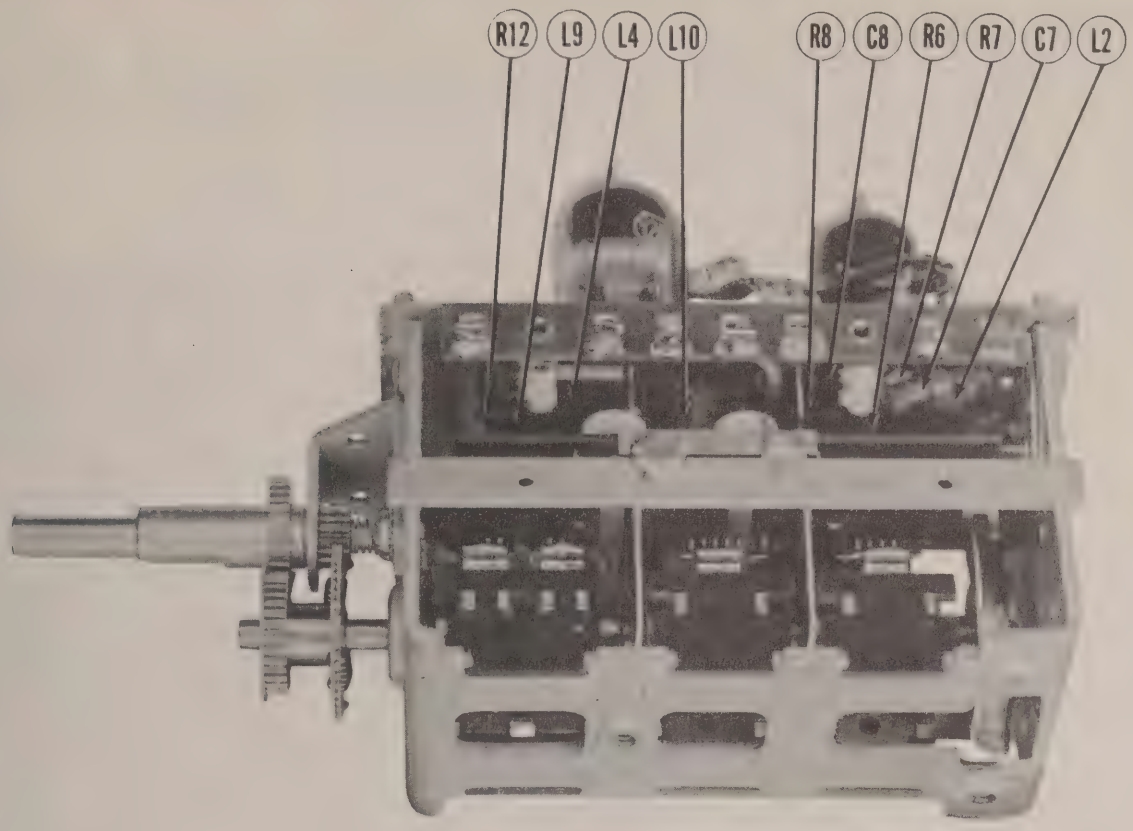
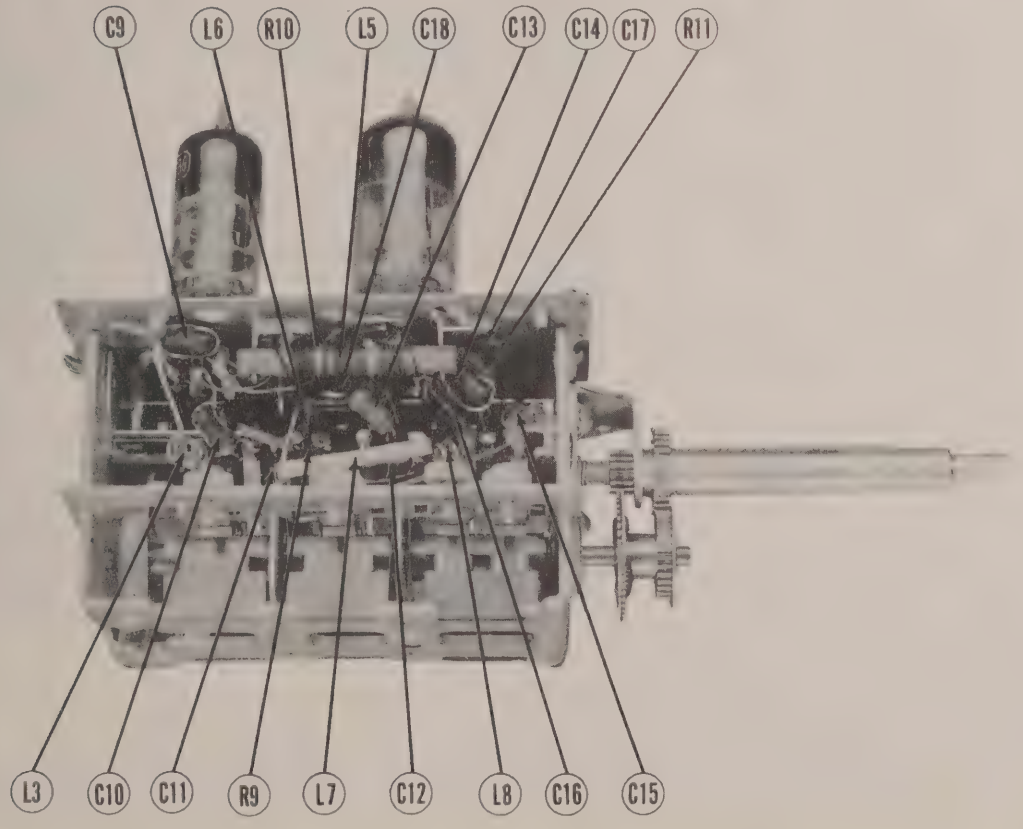


FIG.4



RF TUNER-RIGHT SIDE



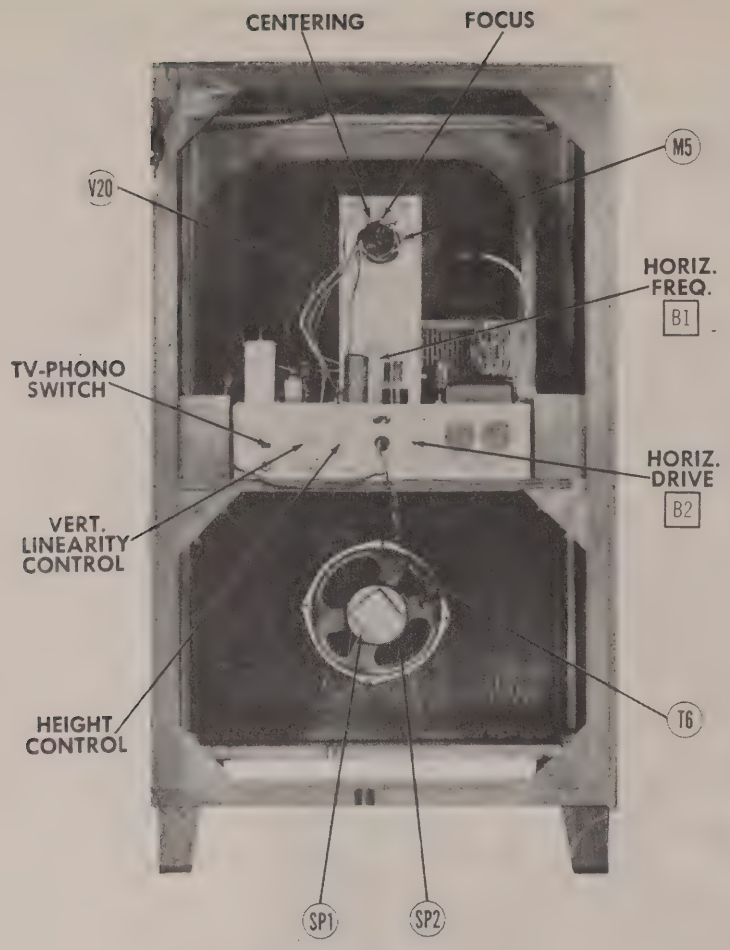
RF TUNER-LEFT SIDE

RESISTANCE MEASUREMENTS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	1.5Meg	0Ω	.2Ω	0Ω	■2.8KΩ	■2.8KΩ	0Ω		
V 2	12AT7	■100Ω	100KΩ	.0Ω	0Ω	0Ω	■570Ω	18KΩ	0Ω	.3Ω
V 3	6CB6	1.5Meg	130Ω	.1Ω	0Ω	■1.1KΩ	■1.1KΩ	0Ω		
V 4	6CB6	1.5Meg	130Ω	.1Ω	0Ω	†10KΩ	■1KΩ	0Ω		
V 5	6CB6	.3Ω	150Ω	.1Ω	0Ω	■560Ω	■560Ω	150Ω		
V 6	6AL5	.3Ω	680KΩ	.1Ω	0Ω	2.1KΩ	Inf.	6.8KΩ		
V 7	6CB6	1Meg	340Ω	.1Ω	0Ω	■18KΩ	■0Ω	0Ω		
V 8	6SN7GT	■1Meg	■4.2KΩ	2.2KΩ	560KΩ	■1Meg	22KΩ	0Ω	.1Ω	
V 9	6AU6	■150KΩ	■0Ω	■0Ω	■.1Ω	†1KΩ	†8KΩ	■0Ω		
V 10	6T8	Inf.	■13KΩ	Inf.	■.1Ω	■0Ω	■0Ω	■0Ω	■6.8Meg	†220KΩ
V 11	6V6GT	Inf.	■.1Ω	†470Ω	†69Ω	240KΩ	†110KΩ	■0Ω	10KΩ	
V 12	6C4	#2.3Meg	Inf.	.1Ω	0Ω	#2.3Meg	1.4Meg	0Ω		
V 13	6SN7GT	2.2Meg	#9.1KΩ	1.5KΩ	2.2Meg	#9.1KΩ	1.5KΩ	.1Ω	0Ω	
V 14	6AL5	56Ω	56Ω	0Ω	.1Ω	4.8Meg	Inf.	4.8Meg		
V 15	6SN7GT	110KΩ	#190KΩ	1.2KΩ	5.1Meg	#15KΩ	1.2KΩ	.1Ω	0Ω	
V 16	6BQ6GT	Inf.	.1Ω	Inf.	†30KΩ	470KΩ	Inf.	0Ω	100Ω	TOP CAP #60Ω
V 17	6W4GT	Inf.	Inf.	560KΩ	Inf.	†90 Ω	Inf.	■0Ω	■.1Ω	
V 18	1B3GT	PINS 1 THROUGH 8 HAVE INFINITE RESISTANCE								TOP CAP #265Ω
V 19	5U4G	Inf.	16KΩ	Inf.	23Ω	Inf.	21Ω	Inf:	16KΩ	
V 20	16TP4	0Ω	22KΩ	PIN10 †100KΩ	PIN11 †105KΩ	PIN 12 .1Ω				

ALL CONTROLS SET FOR NORMAL OPERATION
†MEASURED FROM PIN 8 OF V19
■ MEASURED FROM 145 VDC LINE
MEASURED FROM PIN 3 OF 17



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV Station, preferably a test pattern.

Turn the horizontal hold control to the mid position of its range.

Adjust the horizontal frequency slug B 1, to the center of the range over which the picture synchronizes horizontally.

Adjust the horizontal drive trimmer, (B2), counter-clockwise as far as possible without causing a bright vertical line in the picture.

Adjust the width slug, (B3), until the picture is slightly wider than necessary to fill the mask horizontally.

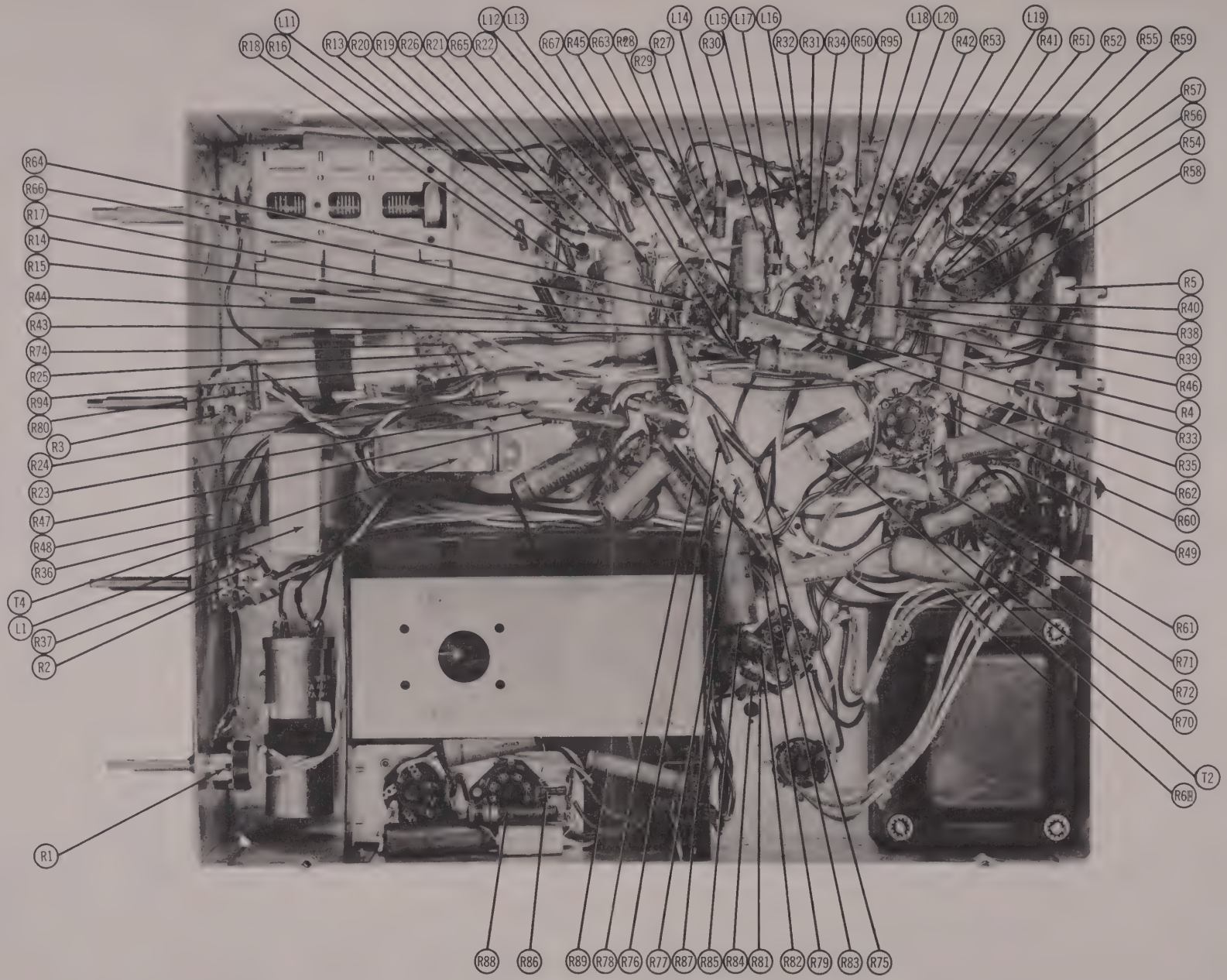
Adjust the horizontal linearity slug, (B4), until the picture is symmetrical from left to right.

Since both width and horizontal linearity are effected by the drive trimmer, it may be necessary to adjust B2, B3, and B4 alternately for the best results.

DISASSEMBLY INSTRUCTIONS

1. Remove seven push-on type control knobs.
2. Remove seven wood screws from rear cover. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove antenna terminal strip.
5. Remove four 5/16" hex head bolts from chassis. Remove chassis.
6. Remove two wood screws from speaker. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE THE CHASSIS AS OUTLINED ABOVE.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6CB6	6CB6	7CM	
V2	Converter	12AT7	12AT7	9A	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector AGC Rectifier	6AL5	6AL5	6BT	
V7	Video Amplifier	6CB6	6CB6	7CM	
V8A	DC Restorer-Sync. Separator - Sync. Phase Inverter	6SN7GT	6SN7GT	8BD	
B	DC Restorer-Sync. Seperator-Sync. Phase Inverter	12AU7	12AU7	8A	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Detector-AF Amplifier	6T8	6T8	9E	
V11	Audio Output	6V6GT	6V6GT	7AC	
V12	Vert. Oscillator	6C4	6C4	6BG	
V13	Vert. Amplifier Vert. Discharge	6SN7GTA	6SN7GTA	8BD	
V14	Horiz. Phase Det.	6AL5	6AL5	6BT	
V15	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V16	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V17	Damper	6W4GT	6W4GT	4CG	
V18	HV Rectifier	1B3GT	1B3GT	3C	
V19	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MITCHELL PART No.	SYLVANIA PART No.	THOMAS PART No.	RTMA BASE TYPE	NOTES
V19A	16TP4	16KP4 ④	16KP4 ④	12D	④ Space permitting
B	17BP4A	17BP4A	17BP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	60	450	N-8038	AFH2-61		UPT62245		TVL-2770	▲ Filter
B	40	450							▲ Filter
C2A	80	200	N-8040	AFH4-120		UPT4145-820		TVL-4700	▲ Decoupling
B	40	200				BRH501			▲Decoupling
C	100	50							▲ Vert. Amp. Cathode
D	10	450							Decoupling
C3	100	250	N-8037	AFH1-36		UP8025		TVL-1535	Audio Output Dec.
C4A	10	450	N-8029	AFH2-47		UPT145		TVL-2750	● Vert. Amp. Dec.
B	10	450							▲ Vert. Osc. Dec.
C5	4	50	N-8054	PRS150M		BR550		TVA-1303	Horiz. Output Cathode
C6	16	50	N-6912.	PRS150/16		BBR66-90		TVA-1409	Stabilizing Cap.
C7	100			SI100	D6-101		GP1K-101	5GA-T1	RF Coupling
C8A	1000			BPD-2X001	DD-2-102		812-001	5HK-2D1	AGC Filter
B	1000								Mixer Plate Dec.
C9	500			SI500	D6-501		GP2K-501	5GA-T5	RF Amp. Dec.
C10	500			SI500	D6-501		GP2K-501	5GA-T5	RF Coupling
C11	25			SI25NP0	TCZ-25		NP0K-250	5TCC-Q25	Fixed Padder
C12	33				TCN-33		N750K-330	5TCU-Q33	Fixed Padder
C13	47			SI47N750	TCN-47		N750L-470	5TCU-Q47	RF Coupling
C14	15				TCN-15		N750K-150	5TCU-Q15	Osc. Grid Cap.
C15	30				TCN-30		N750K-300		Fixed Padder
C16	5			SI5N750			N750K-050		Osc. Feedback
C17A	1000			BPD-2X001	DD-2-102		812-001	5HK-2D1	Osc. Plate Dec.
B	1000								Conv. Filter
C18	30			SI20NP0	TCZ-20		NP0K-200		Fixed Trimmer
C19	.1	200		P288-1	DF-104	PTE4P1		2TM-P1	RF Bypass
C20	5000			BPD-005	DD-502		81l-005	5HK-D5	Fil. Bypass
C21	1500			BPD-0015	DD-152		801-0015	5HK-D15	RF Bypass †
C22	100		N-6015	SI100	D6-101	5W5T1	GP1K-101	5GA-T1	IF Coupling
C23	1000		N-6887	BPD-001	DD-102	1W5D1	801-001	5HK-D1	AGC Filter
C24	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	1st. Video IF Dec.
C25	1500		N-7371	BPD-0015	DD-152	1W5D15	801-0015	5HK-D15	1st. Video IF Cathode
C26	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	1st. Video IF Filter
C27	100		N-6015	SI100	D6-101	5W5T1	GP1K-101	5GA-T1	IF Coupling
C28	1000		N-6887	BPD-001	DD-102	1W5D1	801-001	5HK-D1	AGC Filter
C29A	4000		N-7774	BPD-2X004	D6-402	1D5D4	822-004	5HK-2D4	2nd. Video IF Plate
B	4000				D6-402	1D5D4			2nd. Video IF Screen
C30	1500		N-7371	BPD-0015	DD-152	1W5D15	801-0015	5HK-D15	2nd. Video IF Cathode
C31	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	2nd. Video IF Filter
C32	100		N-6015	SI100	D6-101	5W5T1	GP1K-101	5GA-T1	IF Coupling
C33	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	3rd. Video IF Dec.
C34A	4000		N-7774	BPD-2X004	D6-402	1D5D4	822-004	5HK-2D4	3rd. Video IF Cathode
B	4000				D6-402	1D5D4			3rd. Video IF Filter
C35	100		N-6015	SI100	D6-101	5W5T1	GP1K-101	5GA-T1	IF Coupling
C36	100		N-6015	SI100	D6-101	5W5T1	GP1K-101	5GA-T1	IF Coupling
C37	.25	400	N-2579	P488-25		GP4P25		4TM-P25	AGC Filter
C38	.01	400	N-1344	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	RF Bypass
C39	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	Video Det. Filter
C40	10	500	N-7843	1469-00001	TCZ-10	5R5Q1	NP0K-100	MS-41	Video Det. Filter
C41	.05	200	N-1345	P288-05	DF-503	PTE4S5		2TM-S5	Video Coupling
C42	.0002	500	N-8106	1468-0002	D6-201	5W5T2	GP2K-201	1FM-32	Video Amp. Cathode §
C43	47	500	N-7836	1469-00005	TCZ-47	5R5Q5	NP0L-470	MS-45	Cont. Cont. Shunt
C44	.1	400	N-1623	P488-1	DF-104	PTE4P1		4TM-P1	Video Coupling
C45	.1	400	N-1623	P488-1	DF-104	PTE4P1		4TM-P1	Video Coupling
C46	.5	200	N-6896	P288-5		GT2P5		2TM-P5	DC. Rest. Cathode
C47	.1	200	N-1351	P288-1	DF-104	PTE4P1		2TM-P1	Picture Tube Cathode
C48	.1	400	N-1623	P488-1	DF-104	PTE4P1		4TM-P1	Acc. Anode Dec.
C49	5		N-7776	SI5NP0	TCZ-4.7		NP0K-050		Sound IF Coupling
C50	68		N-7844				N080-338		
							680		Fixed Trimmer
C51	47	500	N-7836	1469-00005	TCZ-47	5R5Q5	NP0L-470	MS-45	Sound IF Coupling

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C52	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	Sound IF Plate Dec.
C53	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	Sound IF Screen Bypass
C54	.02	400	N-1378	P488-02	DF-203	PTE4S2		4TM-S2	Sound IF Cathode Dec.
C55	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	RF Bypass
C56	2200	500	N-6891	1467-0025	D6-222	1W5D25	GP2-333-222		RF Bypass
C57	3900	500	N-6892	1467-004	D6-392	1DR5D4	GP2-333-392	1FM-24	De-emphasis
C58	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	RF Bypass
C59	.02	400	N-1378	P488-02	DF-203	PTE4S2		4TM-S2	Audio Coupling
C60	.08	200	N-8092						Phono Isolation
C61	.005	600	N-4894	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Coupling
C62	100		N-6015	SI100	D6-101	5W5T1	GP1K-101	5GA-T1	AF Amp. Plate Bypass
C63	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	AF Amp. Fil. Bypass ¶
C64	.02	400	N-1378	P488-02	DF-203	PTE4S2		4TM-S2	Audio Coupling
C65	.05	200	N-1345	P288-05	DF-503	PTE4S5		2TM-S5	Audio Output Grid Dec.
C66	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	Audio Output Cath. Dec. ¶
C67	.005	600	N-4894	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Output Plate
C68	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	RF Bypass
C69A	.002			P688-002		PTE6D2	GP2-333-202		Vert. Integrator Net.
B	.005		*N-8042	P688-005	*PC-100	PTE6D5	GP2-333-502	*101C1	Vert. Integrator Net.
C	.005			P888-005		PTE6D5	GP2-333-502		Vert. Integrator Net.
C70	4700	500	N-6893	1464-005		1DR5D5		MS-25	Vert. Osc. Grid Cap.
C71	.1	400	N-1623	P488-1	DF-104	PTE4P1		4TM-P1	Vert. Discharge
C72	.25	400	N-2579	P488-25		GT4P25		4TM-P25	Vert. Sweep Coupling
C73	.05	400	N-1346	P488-05	DF-503	PTE4S5		4TM-S5	Fixed Trimmer
C74	1200	500	N-7783		D6-122		GP2-333-122		Horiz. Sync. Coupling †
C75	1200	500	N-7783		D6-122		GP2-333-122		Horiz. Sync. Coupling †
C76	.05	1000	N-8105	P1088-05		GT16S5		MB-S5	Horiz. Feedback
C77	.1	200	N-1351	P288-1	DF-104	PTE4P1		2TM-P1	AFC Filter
C78	.005	600	N-4894	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	AFC Filter
C79	.1	200	N-1351	P288-1	DF-104	PTE4P1		2TM-P1	AFC Filter
C80	900	500		1464-0009		2R5T9		MS-39	Fixed Trimmer 5§
C81	3000	500		1464-003		1R5D3		MS-23	Fixed Trimmer ¶
C82	330	500	N-7777	1469-00035					Horiz. MV Feedback
C83	47	500	N-7836	1469-00005		5R5Q5		MS-45	Horiz. MV Grid ¶
C84	560	500	N-7780						Horiz. Discharge **
C85	270	500	N-8074	1468-0003	D6-270	5R5T3	GP2K-271	MS-33	Horiz. Sweep Coupling
C86	.25	400	N-2579	P488-25		GT4P25		4TM-P25	Horiz. Output Screen
C87	.25	600	N-6895	684-25		GT6P25		6TM-P25	Horiz. MV Det.
C88	.25	200	N-1479	P488-25		GT2P5		2TM-P5	Horiz. Sweep Coupling ¶¶
C89	800	500		1464-0008		2R5T8		MS-38	Fixed Trimmer †
C90	800	500		1464-0008		2R5T8		MS-38	Fixed Trimmer ¶
C91	.05	1000	N-8105	P1088-05		GT16S5		MB-S5	Damper Filter
C92	500	20000	N-8041	HV20C	TV3-502				HV Filter
C93	.01	600	N-6979	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Line Filter
C94	.01	600	N-6979	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Line Filter
C95	5000		N-6272	BPD-005	DD-502	1D5D5	81l-005	5HK-D5	RF Bypass ¶

† Some Models may use a 5000 MMF Capacitor in this application
§ Some Models may use a 220 MMF Capacitor in this application
¶ Not used in all Models
* C69A, C69B, C69C, R66A, R66B, and R66C are combined in one unit
† Some Models may use a 1100 MMF Capacitor in this application
§§ Some Models may use a 3900 MMF Capacitor in this application
** Some Models may use a 390 MMF Capacitor in this application
¶¶ Some Models may use a .5MFD Capacitor in this application
†† Some Models may use a 1500MMF Capacitor in this application

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	N-7172	Q13-133	AG-60-2	BSK-60-S	Volume Control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SWB	Not Req.	Attach to R1A per instructions
R2A	50KΩ	½	N-8053				Brightness Control-Panel
B	2500Ω	½					Contrast Control - Rear-Tapped ④ 2000Ω
				Concentrikit			
R3A	1Meg	½		B11-137†			Vertical Hold Control - Panel
B	50KΩ	½	N-7338	B11-123†			Horiz. Hold Control - Rear
C	Shaft End			E202†			Attach per instructions in Concentrikit
R4A	2.5Meg	½	N-7341	Q11-239	AG-84-S	AN-83	Height Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R4A per instructions
R5A	3000Ω	½	N-8071	Q11-112	AG-15-S	B-8	Vertical Linearity Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Attach to R5A per instructions

† Additional parts to be used with Concentrikit

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS † 10% UNLESS OTHERWISE SPECIFIED
R6	100KΩ	½		BTS-100K	Antenna Isolation
R7	1000Ω	½		BTS-1000	RF Amp. Grid
R8	2700Ω	½		BTS-2700	RF Amp. Coupling
R9	2200Ω	½		BTS-2200	Parasitic Suppressor
R10	100KΩ 20%	½		BTS-100K	Mixer Grid
R11	18KΩ 5%	½			Osc. Grid
R12	470Ω 20%	½		BTS-470	Osc. Plate
R13	47000Ω 20%	½		BTS-4700	AGC Network
R14	750Ω	½			1st. Video IF Amp. Grid - See Note 3
R15	47Ω	½	N-6237		1st. Video IF Amp. Cathode
R16	82Ω	½	N-5857	BTS-82	1st. Video IF Amp. Cathode
R17	1000Ω	½	N-3341	BTS-1000	1st. Video IF Amp. Decoupling
R18	1000Ω	½	N-3341	BTS-1000	AGC Network
R19	15KΩ	½	N-6424	BTS-15K	2nd. Video IF Amp. Grid
R20	47Ω	½	N-6237		2nd. Video IF Amp. Cathode
R21	82Ω	½	N-5857	BTS-82	2nd. Video IF Amp. Cathode
R22	1000Ω	½	N-3341	BTS-1000	2nd. Video IF Amp. Screen
R23	13KΩ	½	N-8036		2nd. Video IF Amp. Plate Decoupling
R24	47KΩ	2	N-8033	BTB-47K	Voltage Divider
R25	15KΩ	2	N-2970	BTB-15K	Voltage Divider
R26	1000Ω	½	N-3341	BTS-1000	AGC Network
R27	6800Ω	½	N-4630	BTS-6800	3rd. Video IF Coil Shunt
R28	150Ω	½	N-3663	BTS-150	3rd. Video IF Amp. Cathode
R29	560Ω	½	N-4280	BTS-500	3rd. Video IF Amp. Decoupling
R30	6800Ω	½	N-4630	BTS-6800	Video Detector Diode Load
R31	820KΩ	½	N-4469	BTS-820K	AGC Network
R32	680KΩ 20%	½	N-7403	BTS-680K	AGC Rectifier Diode Load
R33	100Ω	½	N-1349	BTS-100	Parasitic Suppressor

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	IDENTIFICATION CODES
R34	1Meg	½	N-2976	BTS-1Meg	Video Amp. Grid
R35	47Ω	½	N-6237		Video Amp. Cathode
R36	180Ω	½	N-4067	BTS-180	Video Compensation Network
R37	1500Ω 20%	½	N-7398	BTS-1500	Video Compensation Network
R38	18KΩ	2	N-8031	BTB-18K	Voltage Divider - See Note 2
R39	15KΩ	2	N-2970	BTB-15K	Voltage Divider
R40	33KΩ	1	N-8044	BTA-33K	Voltage Divider
R41	4700Ω	2		BTB-4700	Video Amp. Plate Decoupling
R42	2200Ω	½	N-4896	BTS-2200	Isolation
R43	560KΩ	½	N-7790	BTS-560K	Sync. Separator Grid
R44	22KΩ	½	N-6012	BTS-22K	Sync. Separator Cathode
R45	1Meg	½	N-2976	BTS-1Meg	Sync. Separator Plate
R46	68KΩ 20%	½	N-4120	BTS-68K	Picture Tube Cathode
R47	390KΩ	½	N-8026	BTS-390K	Voltage Divider
R48	15KΩ	½	N-8424	BTS-15K	Voltage Divider
R49	100KΩ	½	N-2973	BTS-100K	Acc. Anode Load
R50	150KΩ	½	N-4468	BTS-150K	Isolation
R51	8200Ω	1	N-8043	BTA-8200	Sound IF Amp. Screen - See Note 2
R52	1000Ω	½	N-3341	BTS-1000	Sound IF Amp. Decoupling
R53	27KΩ	1	N-7012	BTA-27K	Voltage Divider
R54	13KΩ 5%	½			Ratio Detector Diode Load - See Note 4
R55	270Ω	1	N-4121	BTA-270	Balancing
R56	560Ω	½	N-4280	BTS-560	Balancing
R57	15KΩ	½	N-6424	BTS-15K	De-Emphasis
R58	6.8Meg	½	N-4028	BTS-6.8Meg	AF Amp. Grid
R59	220KΩ	½	N-4899	BTS-220K	AF Amp. Plate
R60	300KΩ 5%	½	N-8025		Voltage Divider
R61	180KΩ 20%	1		BTA-180K	Voltage Divider
R62	100KΩ	½	N-3973	BTS-100K	Output Grid
R63	2200Ω	1		BTA-2200	Sync. Phase Inverter Cathode
R64	1500Ω	½	N-7398	BTS-1500	Sync. Phase Inverter Plate
R65	27000Ω	½	N-8103	BTS-2700	Voltage Divider - See Note 2
R66A	22KΩ	½		BTS-22K	Integrator Network
B	8200Ω	½	*N-8042	BTS-8200	Integrator Network
C	8200Ω	½		BTS-8200	Integrator Network
R67	1.2Meg 20%	½	N-4470	BTS-1.2Meg	Vertical Osc. Grid
R68	1Meg	½	N-2976	BTS-1Meg	Vertical Osc. Plate
R69	56KΩ	½	N-4823	BTS-56K	Vertical Osc. Decoupling
R70	1800Ω	½		BTS-1800	Vertical Peaking - See Note 5
R71	2.2Meg	½	N-4424	BTS-2.2Meg	Vertical Output Grid
R72	820Ω	½	N-4279	BTS-820	Vertical Output Cathode
R73	8200Ω	5	N-8035		Vertical Output Plate - See Note 6
R74	10KΩ	½	N-4895	BTS-10K	Voltage Divider
R75	100KΩ	½	N-2973	BTS-100K	Horiz. Phase Detector Diode Load
R76	100KΩ	½	N-2973	BTS-100K	Horiz. Phase Detector Diode Load
R77	4.7Meg 20%	1	N-4061	BTS-4.7Meg	Horiz. Phase Detector Diode Load
R78	56Ω	1	N-8155		AFC Filter
R79	470KΩ	½	N-5694	BTS-470K	AFC Filter
R80	100KΩ	½	N-2973	BTS-100K	Horiz. Hold Control Shunt
R81	100KΩ	½	N-2973	BTS-100K	Horiz. MV Grid
R82	2200Ω	½	N-6793	BTS-1200	Horiz. MV Cathode - See Note 2
R83	5600Ω	1	N-7406	BTA-5600	Horiz. MV Plate
R84	180KΩ 20%	1		BTA-180K	Horiz. MV Plate
R85	4700Ω	½		BTS-4700	Horiz. Peaking - See Note 3
R86	100Ω	½	N-1349		Parasitic Suppressor
R87	470KΩ	½	N-5694	BTS-470K	Horiz. Output Grid
R88	100Ω	2	N-8030	BW-2-100	Horiz. Output Cathode - Wire Wound
R89	33KΩ	2	N-8032	BTB-33K	Horiz. Output Screen
R90	100KΩ	1	N-8028	BTA-100K	Horiz. Output Screen - See Note 1
R91	10KΩ	2	N-4229	BTB-10K	Horiz. MV Decoupling
R92	4.3Ω	½	N-8126		HV Filament - Wire Wound
R93	470KΩ	1	N-8029		HV Filter
R94	100Ω	½	N-1349	BTS-100	Decoupling
R95	150KΩ	½	N-4468	BTS-150K	Voltage Divider

* R66A, R66B, R66C, C69A, C69B, C69C, are combined in one unit.
Note 1. Not used in all Models
Note 2. Some Models use resistors in parallel to obtain desired value
Note 3. Some Models use 6800Ω resistor in this application
Note 4. Some Models use 12KΩ resistor in this application
Note 5. Some Models use 3900Ω resistor in this application
Note 6. Some Models use 5300Ω resistor in this application

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MITCHELL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC ② 1.82A	660VCT .330ADC	5VAC ③ 3.0A	6.3VAC ② 6.0A SEC. 4 6.3VAC ② 2.5A	N-8069		P-3070	

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: MITCHELL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	175Ω	950Ω	N-7764	A-8111 ②	A-3000 ②	TB0-1 ③	Vert. Blocking Osc. Trans.
T3	265Ω Tapped ② 20Ω	0Ω ② 6Ω SEC. 2 0Ω	N-8104 N-8070 ④	A-8130	HVO-7		Horiz. Output Trans.
T4	1270Ω Tapped ② 10Ω		N-7717	A-8123	A-3036	TS0-5	Vert. Output Trans.
T5A	9Ω		N-8057	DY-8	MDF-70		Horiz. Deflection Coils
B	5Ω						Vert. Deflection Coils

② Drill one New Mounting Hole.
③ Mount Above Chassis
④ Used in some Models

PARTS LIST CONTINUED ON PAGE 15

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MITCHELL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T6	4.7KΩ	3.3Ω	400Ω	.85Ω	Part of N-8055	A-3849	A-3019	RO-9	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	MITCHELL PART No.	JENSEN PART No.	QUAM PART No.	
SP1	P.M.	3.3Ω	N-8055	ST-115 Mod. P8-V	8A21	Used in Consolette Models only
SP1	P.M.	3.3Ω	N-8170	ST-105 Mod. P5-X	5A1	Used in Table Models only
	CONE DIA.	V. C. DIA.				
SP2	7½"	9/16"				
SP2	5'	9/16'				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	MITCHELL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.230A	69Ω	2.6 Henries	N-8064	C-2326①	C-2991①	TR-3300 ①	① Drill one new Mounting Hole.

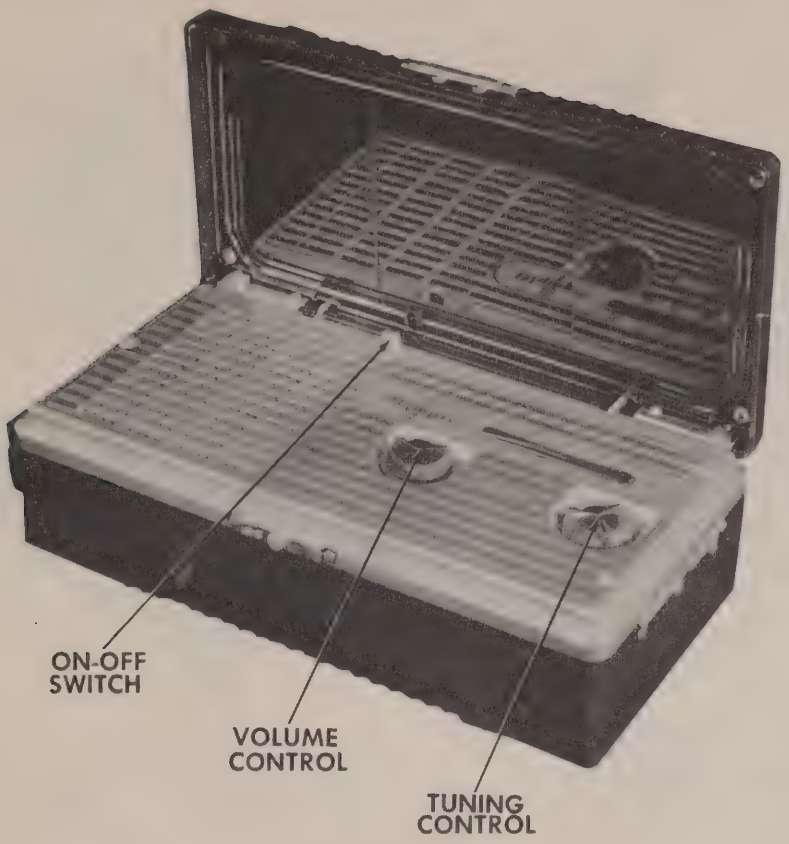
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	MITCHELL PART No.	IRC PART No.	
L2	Ant. Trans.	.2Ω	.2Ω			
L3	Ant. Shunt Coil	.2Ω				
L4	Fil. Choke	.1Ω				
L5	RF Mixer Grid Osc.	0Ω				Lc-Band
L6	RF Coil	0Ω				Hi-Band
L7	Mixer Coil	0Ω				Hi-Band
L8	Osc. Coil	0Ω				Hi-Band
L9	Cath. Choke	.1Ω				
L10	1st. Video IF	.1Ω				
L11	2nd. Video IF	.5Ω		N-7745		
L12	RFChoke	8.2Ω		N-7321	CL-1	10 Michrohenries
L13	3rd. Video IF	.5Ω		N-7745		
L14	RF Choke	8.2Ω		N-7321	CL-1	10 Michrohenries
L15	4th. Video IF	.5Ω		N-7745		
L16	Peaking Coil	6.2Ω		N-8060		174 Michrohenries wound on 18K Resistor
L17	Peaking Coil	16Ω		N-8059		
L18	Peaking Coil	7Ω		N-8061		217 Michrohenries wound on 22K Resistor
L19	Peaking Coil	12Ω		N-8062		578 Michrohenries wound on 5.6K Resistor
L20	Sound IF	1.3Ω		N-7746		
L21	Ratio Det. Trans.	3.4Ω	.5Ω	N-7744		Tap at .6Ω
L22	Horiz. Osc.	65Ω		N-7748		
L23	Width Coil	22Ω		N-8134		
L24	Horiz. Lin.	43Ω		N-8063		

MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M2	RF Tuner		
M3	Switch	N-8099	T.V. - Phono
M4	Focus Magnet	N-8067	
M5	Ion Trap	N-7929	
B2	Trimmer	N-7375	20-270MMF (Horiz. Drive)

OLYMPIC
MODEL 489



OLYMPIC
MODEL 489

TRADE NAME	Olympic Model 489
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th Ave., Long Island City 1, New York.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types 1R5 Converter, 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Power Output.
POWER SUPPLY	1.5 Volts "A" Supply & 67.5 Volts "B" Supply RATING 250 MA @ 1.5 Volts & 9MA @ 67.5 Volts
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning gang fully closed and set pointer over reference dot at low frequency end of pointer carriage slide. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to RF section of tuning gang. Low side to chassis.	455KC (400~Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	"	A5,	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune for max. output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	535KC	Tuning gang fully closed.	"	A7	" Repeat steps 2, 3 & 4.

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PARTS LIST AND DESCRIPTIONS

OLYMPIC MODEL 489

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Olympic PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Detector -AVC-AF Amplifier	1U5	1U5	6BW	
V4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	8	100	CO-1323	SRE150/10		BR815		TVA-1405	Decoupling
C2	10000			BPD-01	DD-103		821-01	5HK-S1	AVC Filter
C3	50			SI47N750	TCN-47		N750K-470	5TCU-Q47	Osc. Grid Cap.
C4	100			SI100	D6-101		GP1K-101	5GA-T1	Diode RF Filter
C5	2000			BPD-002	DD-202		801-002	5HK-D2	Audio Coupling
C6A	100		♦PC-2489	SI100	♦PC-91		GP1K-101	5GA-T1	AF Amp. Plate
B	.005			BPD-005			811-005	5HK-D5	AF Amp. Screen
C	.005			BPD-005			811-005	5HK-D5	Audio Coupling
C7	5000			BPD-005	DD-502		811-005	5HK-D5	Power Output Plate

♦Items C6A, C6B, C6C, R5A, R5B, R5C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1 Meg	½	PT-1313	Q13-137	AG-63-Z	B-10	Volume Control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions.

RESISTORS

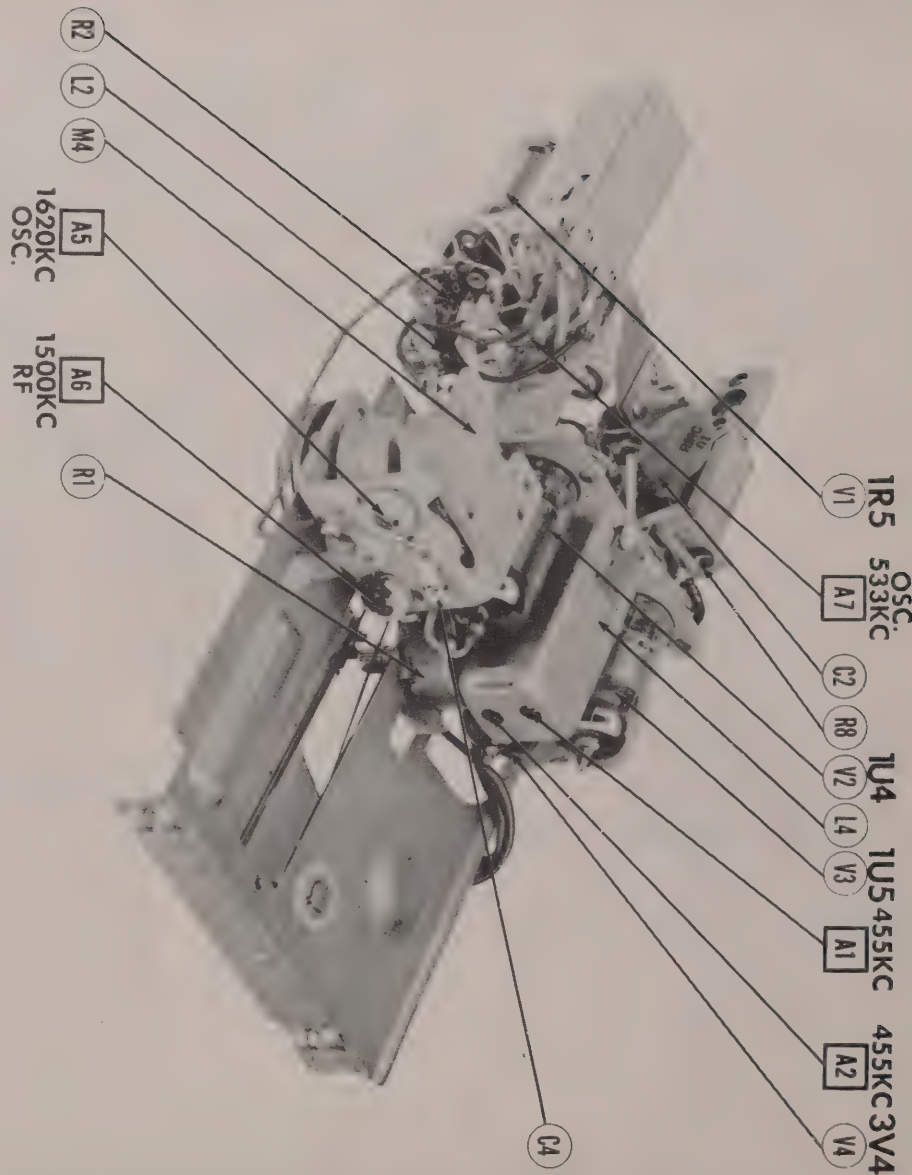
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	IDENTIFICATION CODES
R2	100KΩ	½		BTS-100K	Oscillator Grid
R3	4.7Meg	½		BTS-4.7Meg	AVC Network
R4	10Meg	½		BTS-10Meg	AF Amp. Grid
R5A	4.7Meg	½	♦PC-2489	BTS-4.7Meg	AF Amp. Screen
B	1Meg	½		BTS-1Meg	AF Amp. Plate
C	2.2Meg	½		BTS-2.2Meg	Output Grid
R6	470Ω	½		BTS-470	Bias Network

♦ Items R5A, R5B, R5C, C6A, C6B, C6C are combined in one unit

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: OLYMPIC PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	7.5KΩ	3.7Ω	3.5Ω	.4Ω	TR-2544		A-2927		
					TR-1279 ①				① Alternate Transformer

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: OLYMPIC PART No.	VIKING PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V.C.IMP.				
SP1	P.M.	3.7Ω	SK-1283	35J4	3A07	
	CONE DIA.	V.C.Dia.				
SP2	3 3/8"	9/16"				

R F COILS

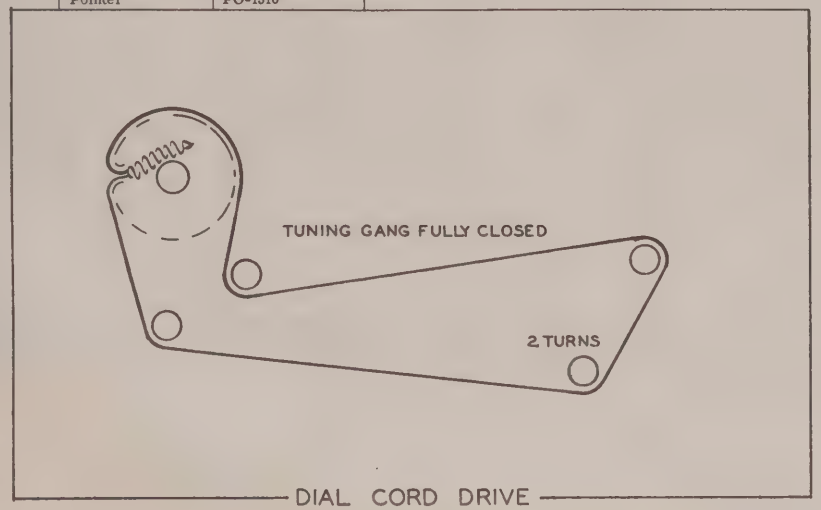
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: OLYMPIC PART No.		
L1	Loop Ant.	4.4Ω				
L2	Osc. Coil	1Ω	4.7Ω	CL-2531		
L3	Input IF	16Ω	16Ω	TR-1314		
L4	Output IF	16Ω	16Ω	TR-1314		

BATTERIES

ITEM No.	VOLTAGE	OLYMPIC PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M1	1.5 Volts "A"		950			2R			
M2	67½ Volts "B"			467			XX45		

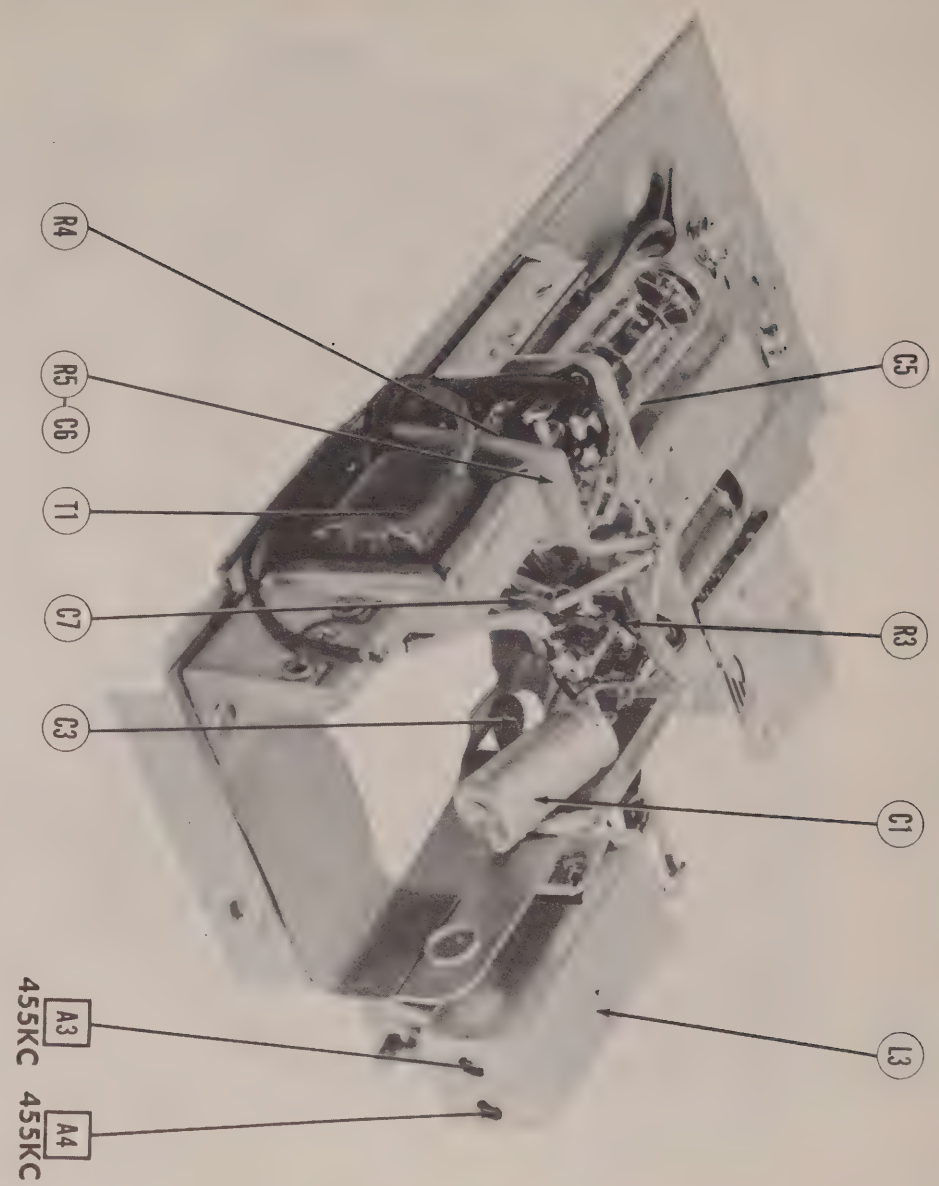
MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Switch	SW-1280	Power On-Off
M4	2Gang Var. Cap.	CV-1291-1	(14-285MMF, 23-143MMF)
	Cover	MP-1290	Moulded
	Case	MP-1292	Moulded
	Knob	KN-1309	
	Pointer	PO-1310	

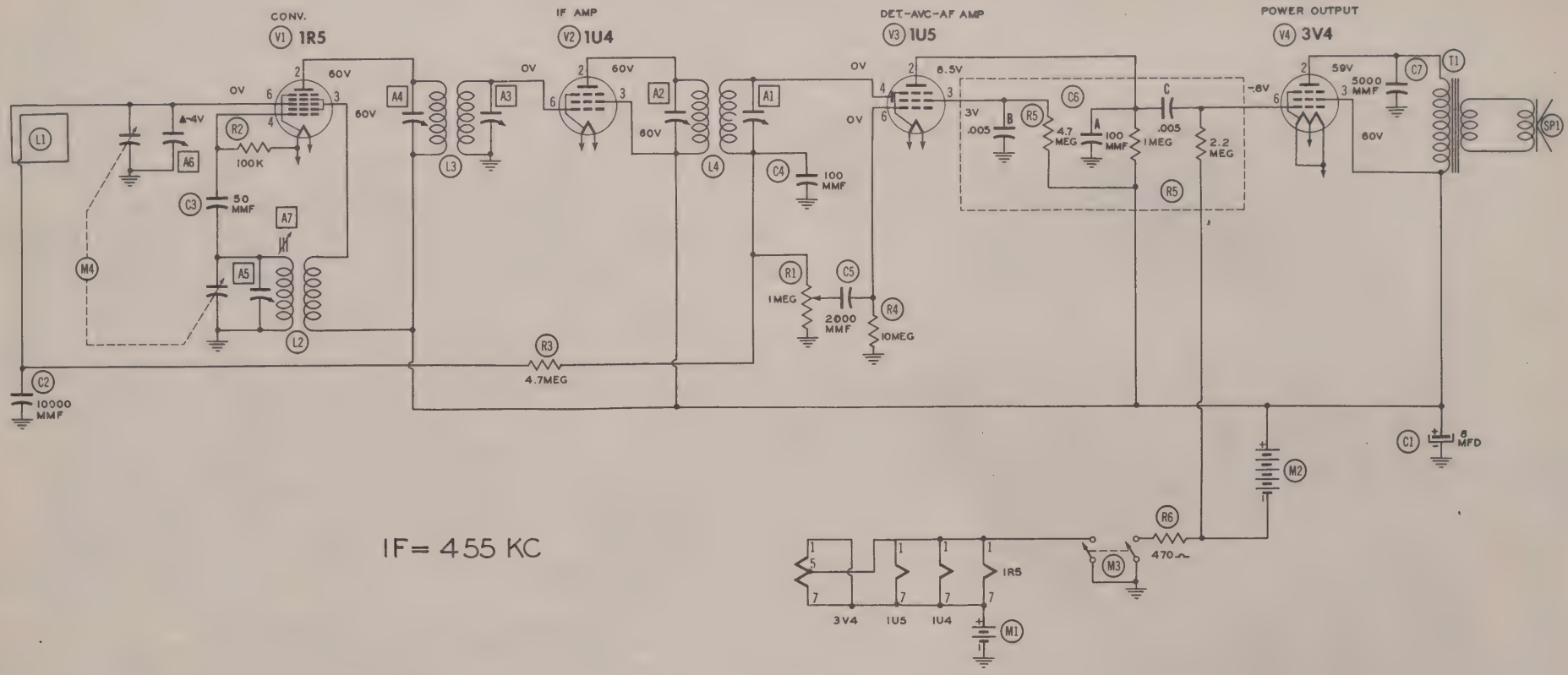


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



OLYMPIC MODEL 489



IF= 455 KC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†16Ω	†1.1Ω	100KΩ	*	5.7Meg	*
V 2	1U4	*	†16Ω	†0Ω	4.7Meg	*	16Ω	*
V 3	1U5	*	†1Meg	†4.7Meg	1Meg	470Ω	10Meg	*
V 4	3V4	*	†315Ω	†0Ω	Inf.	*	2.2Meg	*

▲TAKEN WITH VACUUM TUBE VOLTMETER
†MEASURED FROM POSITIVE SIDE OF M2.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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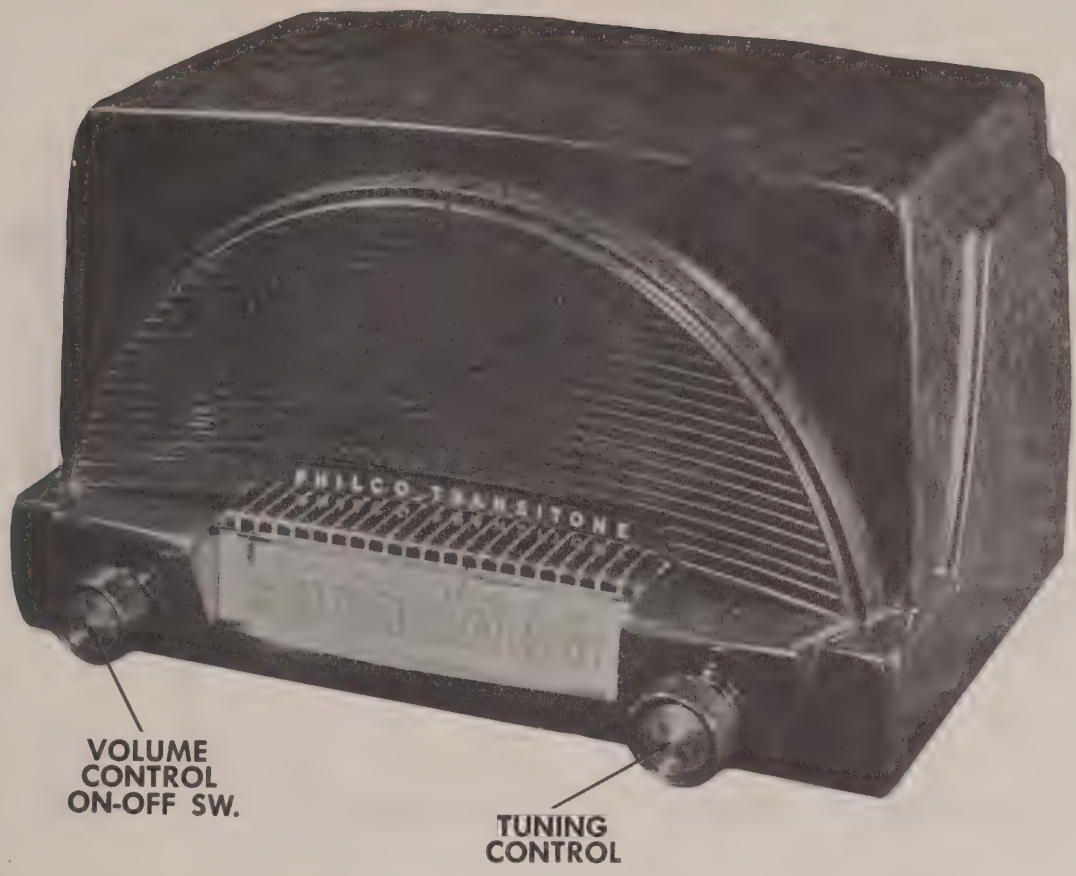
1. DC voltage measurements are at 20,000 ohms per volt; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15 % in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODELS 52-540, 52-540I, 52-541, 52-541I, 52-542I



PHILCO MODELS 52-540, 52-540I, 52-541, 52-541I, 52-542I

PHILCO MODEL 52-542-I

TRADE NAME	Philco, Models 52-540, 52-540-I, 52-541, 52-541-I, 52-542-I
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pennsylvania
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 7A8 Converter, 12BA6 IF Amp., 12AV6 DET.-AVC-AF, 35L6GT or 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC-DC — RATING .22 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	540-1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning gang fully closed and set pointer 1 9/16ins. to the right of the center of the volume control shaft. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD.	High side to pin 6, (Grid), of 7A8, (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD. to reduce hum modulation.
2.		Loop	1630KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver Adjust for maximum output.
3.		Loop	1500KC	Tune for max. output.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 52-540

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	Converter	7A8	7A8	8U	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF	12AV6	12AV6	9A	
V4A	Power Output	35L6GT	35L6GT	7AC	
B	Power Output	50L6GT	50L6GT	7AC	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	150	30-2540-1	PRS150/30-30-30		EDL32V2-15		TVA-3444	Filter (orange)
B	25	150							Filter (blue)
C	20	150							Filter (red)
C2	4.7		30-1230	SI4.7NP0	TCZ-4.7		NP0K-4R7		RF Coupling
C3	.05	400	61-0122	P488-05	DF-503	PTE4S5		4TM-S5	AVC Filter
C4	47		60-00475417	SI47	D6-470	5W5Q5	GP1K-470	5GA-Q47	Osc. Grid Cap.
C5	.003	400	61-0109	P688-003	D6-302	PTE6D3	GP2-333-302	6TM-D3	RF Bypass
C6	.01	400	61-0120	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Audio Coupling
C7A	.007		30-1239-4	P688-0068	D6-682		GP2-333-682	5HK-D68	Audio Coupling
B	220			SI220	D6-221	5W5T25	GP2K-221	5GA-T22	Power Output Grid
C8	.05	400	61-0122	P488-05	DF-503	PTE4S5		4TM-S5	Power Output Plate †
C9	.04	400	45-3500-2	P688-04		PTE6S4		6TM-S4	Line Filter
C10	.1	400	61-0113	P488-1	DF-104	PTE4P1		4TM-P1	Line Isolation

† Some models use .02MFD. in this application. (Part # 61-0108)

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	33-5538-7	Q13-133	AM-60-Z	B-60-S	Volume Control
B	Shaft		Not req.	Not req.	FS-3	Not req.	Attach to R1A per instructions
C	Switch		Not req.	76-1	SWB	Not req.	Attach to R1A per instructions

RESISTORS

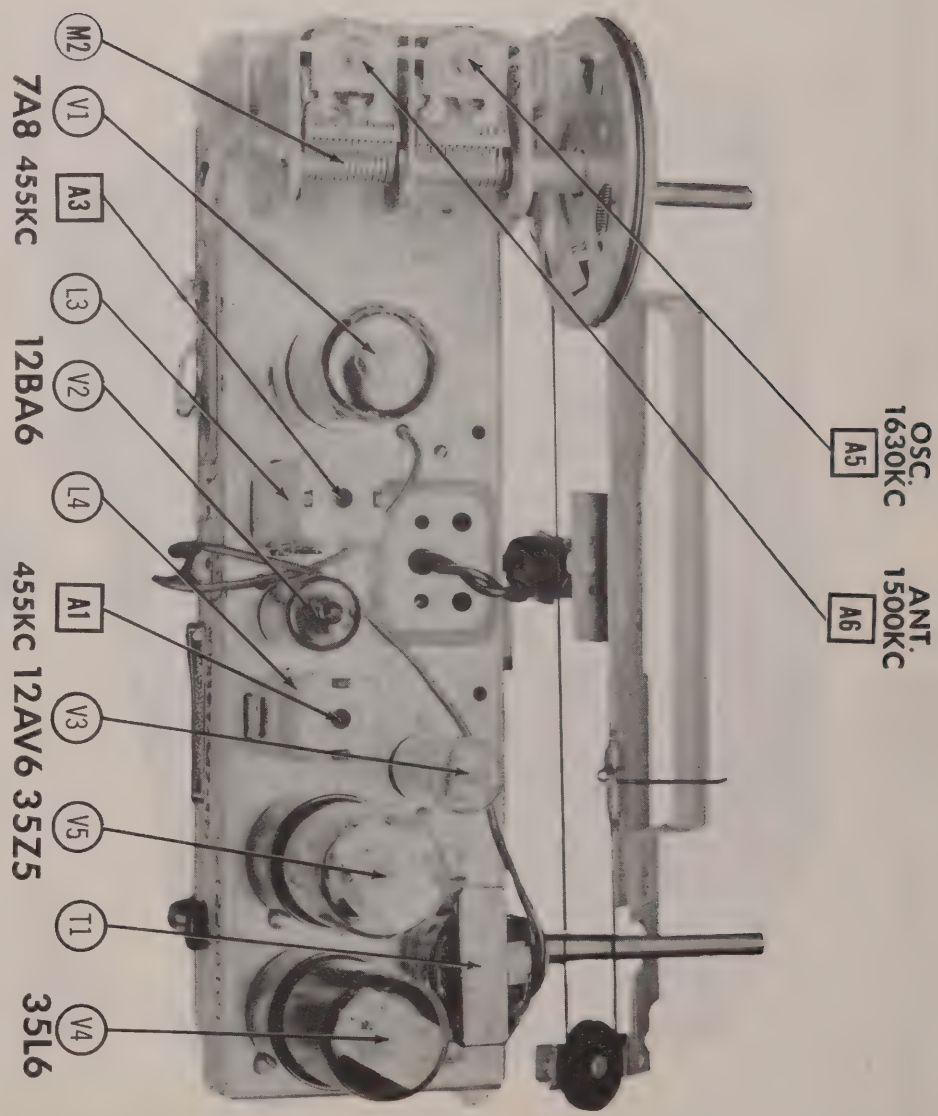
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
R2	150KΩ	½	66-4158340	BTS-150K	Antenna Loading
R3	150KΩ	½	66-4158340	BTS-150K	Line Isolation
R4	100KΩ	½	66-4108340	BTS-100K	Osc. Grid
R5	39KΩ	½	66-3398340	BTS-39K	Screen Dropping
R6	2.2Meg	½	66-5228340	BTS-2.2Meg	IF Amp. Grid
R7	68Ω	½	66-0688340	BW-½-68	IF Amp. Cathode
R8	47KΩ	½	66-3478340	BTS-47K	RF Diode Filter
R9	2.2Meg	½	66-5228340	BTS-2.2Meg	AVC Network
R10	3.3Meg	½	66-5338340	BTS-3.3Meg	AF Amp. Grid
R11	470KΩ	½	66-4478340	BTS-470K	AF Amp. Plate Load
R12	470KΩ	½	66-4478340	BTS-470K	Output Grid
R13	130Ω	½	66-1138340	BTS-150	Output Cathode
R14	2200Ω	½	66-2228340	BTS-2200	Tone Compensation - See Note
R15	1200Ω	½	66-2128340	BTS-1200	Filter
R16	220Ω	1	66-1224340	BTA-220	Filter
R17	♦	½			Series Filament

♦ Special negative temperature coefficient resistor - Order from manufacturer
Note Not used in model 52-542I.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	2.4KΩ	3-4Ω	220Ω	.6Ω	32-8384	A-3332 ①	A-3025 ①	RO-2 ①	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.	36-1627-5	ST113		
SP1	PM 3.4Ω		36-1625-3 ②	Model P4-X	4A1	② Used in model 52-542 only.
	CONE DIA.	V. C. DIA.				
SP2	4"	9/16"				

R F COILS

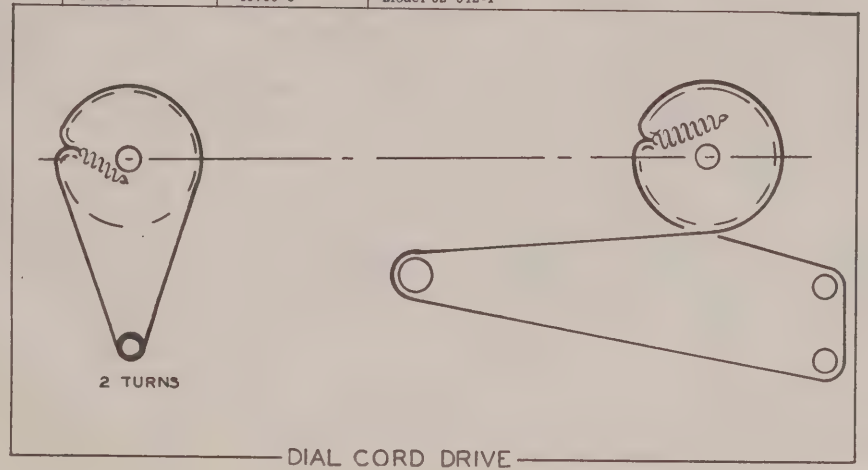
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.		
L1A	Loop Ant.	3.5Ω		32-4052-38		Models 52-542-I
B	Loop Ant.	3.1Ω		32-4052-31		Models 52-541 and 52-541-I
C	Loop Ant.	.2Ω	3.5Ω	32-4052-33		Models 52-540 and 52-540-I
L2	Osc. Coil	7.5Ω	2.6Ω	32-4263		
L3	1st. IF	21Ω	25Ω	32-4160-6A		
L4	2nd. IF	18Ω	17Ω	32-4240-A		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					PHILCO PART No.		
M1	Bayonet	6-8	.15	Brown	34-2068		Type # 47

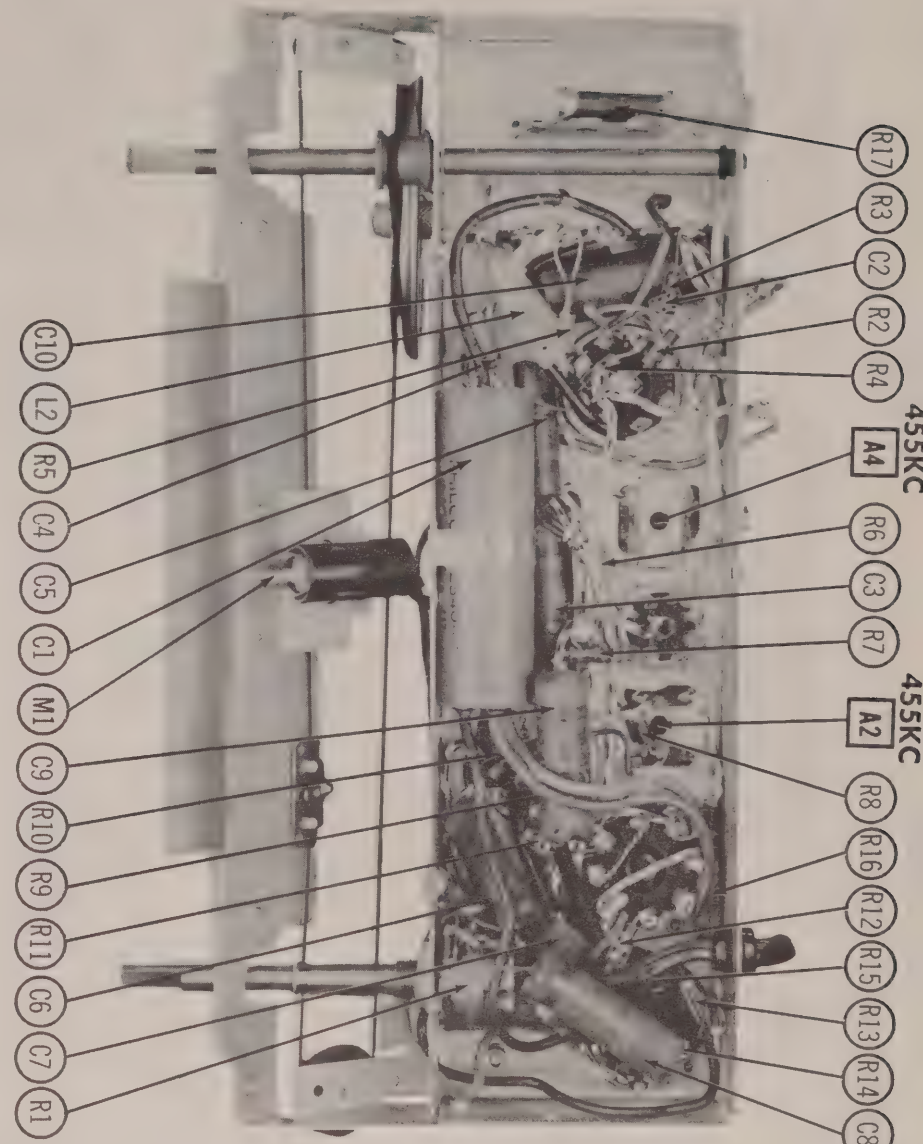
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M2A	2 Gang Var. Cap.	31-2751	(33-542MMF., 29-216MMF)
B	2 Gang Var. Cap.	31-2751-6	Model 52-540
	Cabinet	10750	Model 52-540
	Cabinet	10750-1	Model 52-540-I
	Cabinet	10747	Model 52-541
	Cabinet	10747-1	Model 52-541-I
	Cabinet	10769-8	Model 52-542-I

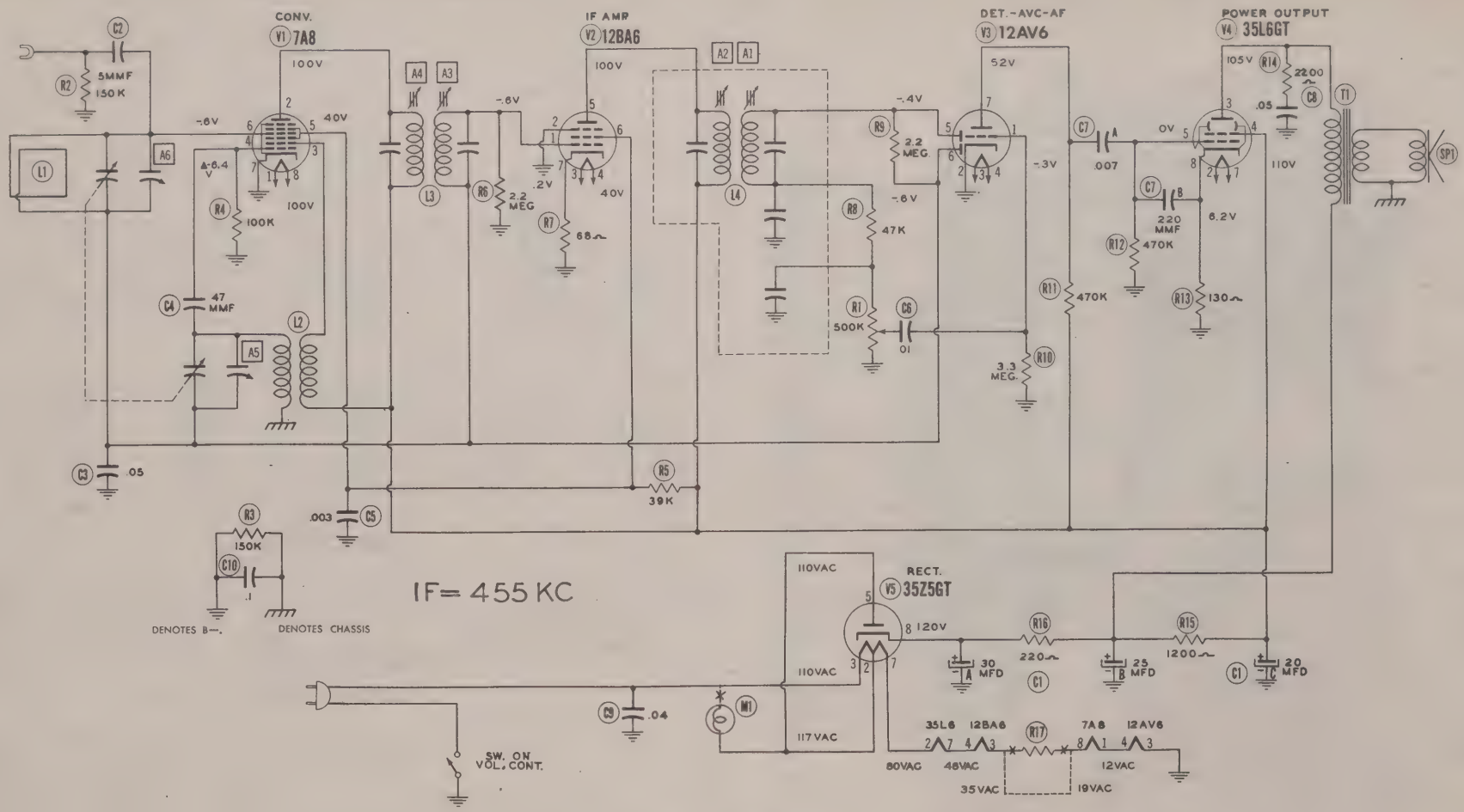


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



PHILCO MODEL 52-540



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	7A8	12Ω	†1.4KΩ	†1.4KΩ	100KΩ	†40KΩ	1.2Meg	0Ω	19Ω
V 2	12BA6	1.2Meg	0Ω~	500Ω	512Ω	†1.4KΩ	†40KΩ	68Ω	
V 3	12AV6	3.3Meg	0Ω	0Ω	12Ω	550KΩ	1.2Meg	†470KΩ	
V 4	35L6GT	†2.4KΩ	542Ω	†440Ω	†1.4KΩ	470KΩ	†220Ω	512Ω	130Ω
V 5	35Z5GT	0Ω	577Ω	559Ω	†1.4KΩ	559Ω	†220Ω	542Ω	40KΩ

▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 8 OF V5

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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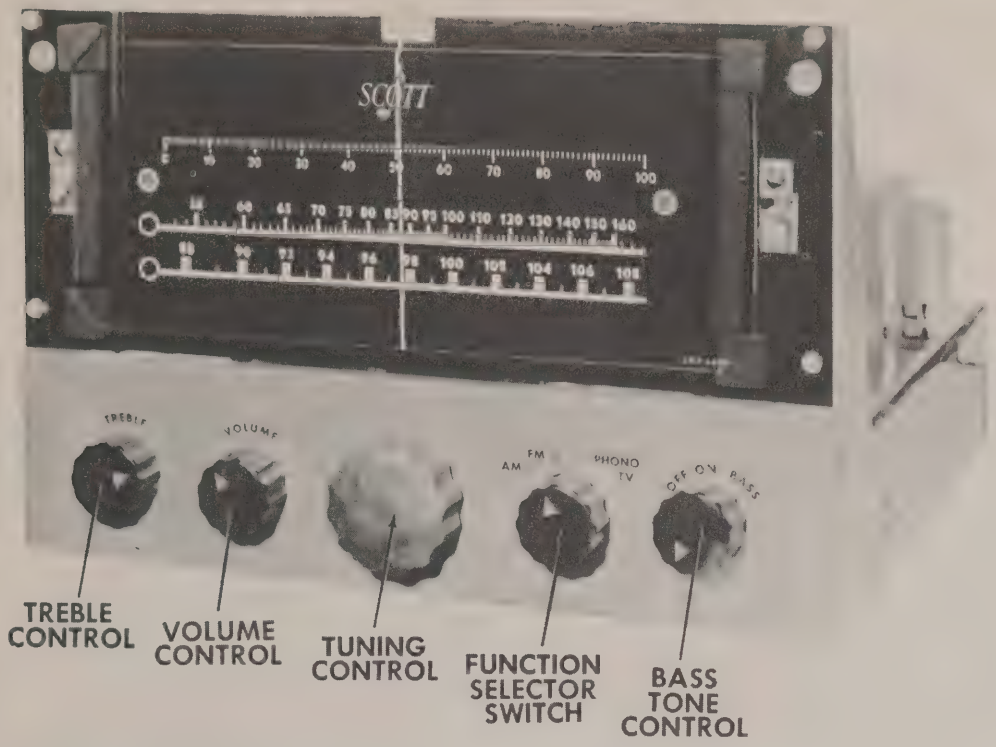
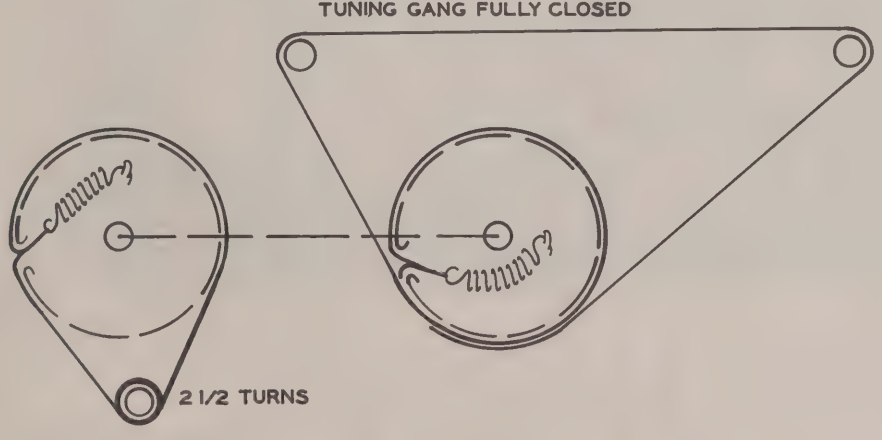
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SCOTT
MODEL 310



SCOTT
MODEL 310

TRADE NAME	Scott, (E.H.) Model 310	
MANUFACTURER	Scott Radio Labs., Inc., 4541 Ravenswood Ave., Chicago, Ill.	
TYPE SET	AC Operated FM-AM-Phono Superhetrodyne Receiver	
TUBES (TWELVE)	Types 6BA6 FM-AM RF Amp., 6C4 FM Osc., 6BE6 FM Mixer-AM Conv., 6BA6 1st FM-AM IF Amp., 6AU6 2nd FM IF Amp. -AM Det., 6AU6 3rd FM IF Amp., 6AL5 Ratio Det., 6SQ7 1st AF Amp., 6SN7GT 2nd AF Amp-Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rect.	
POWER SUPPLY	110-130 Volts AC	RATING .85 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1620KC	FREQ.MOD. 87.5 - 108.5MC



DIAL CORD DRIVE

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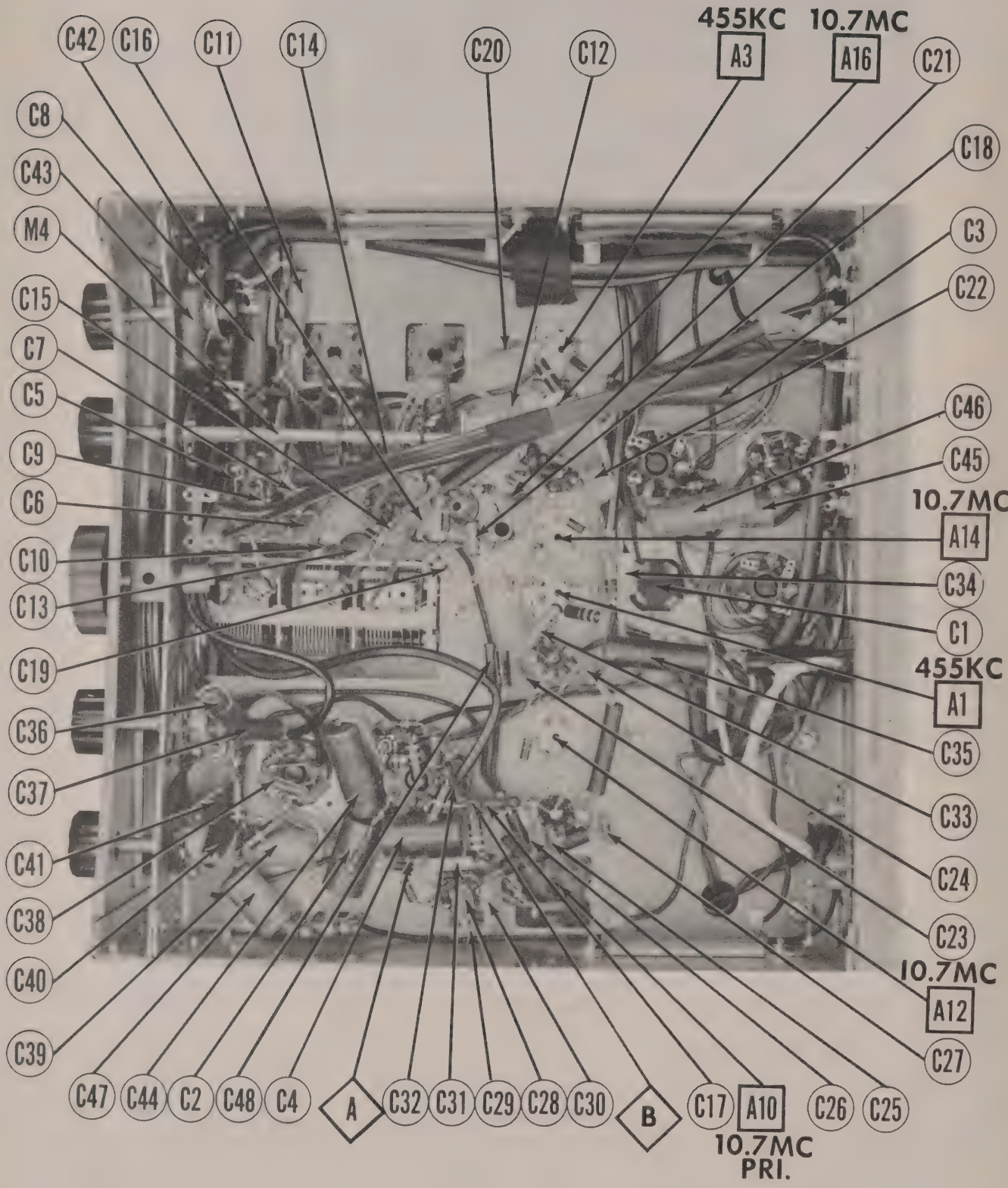
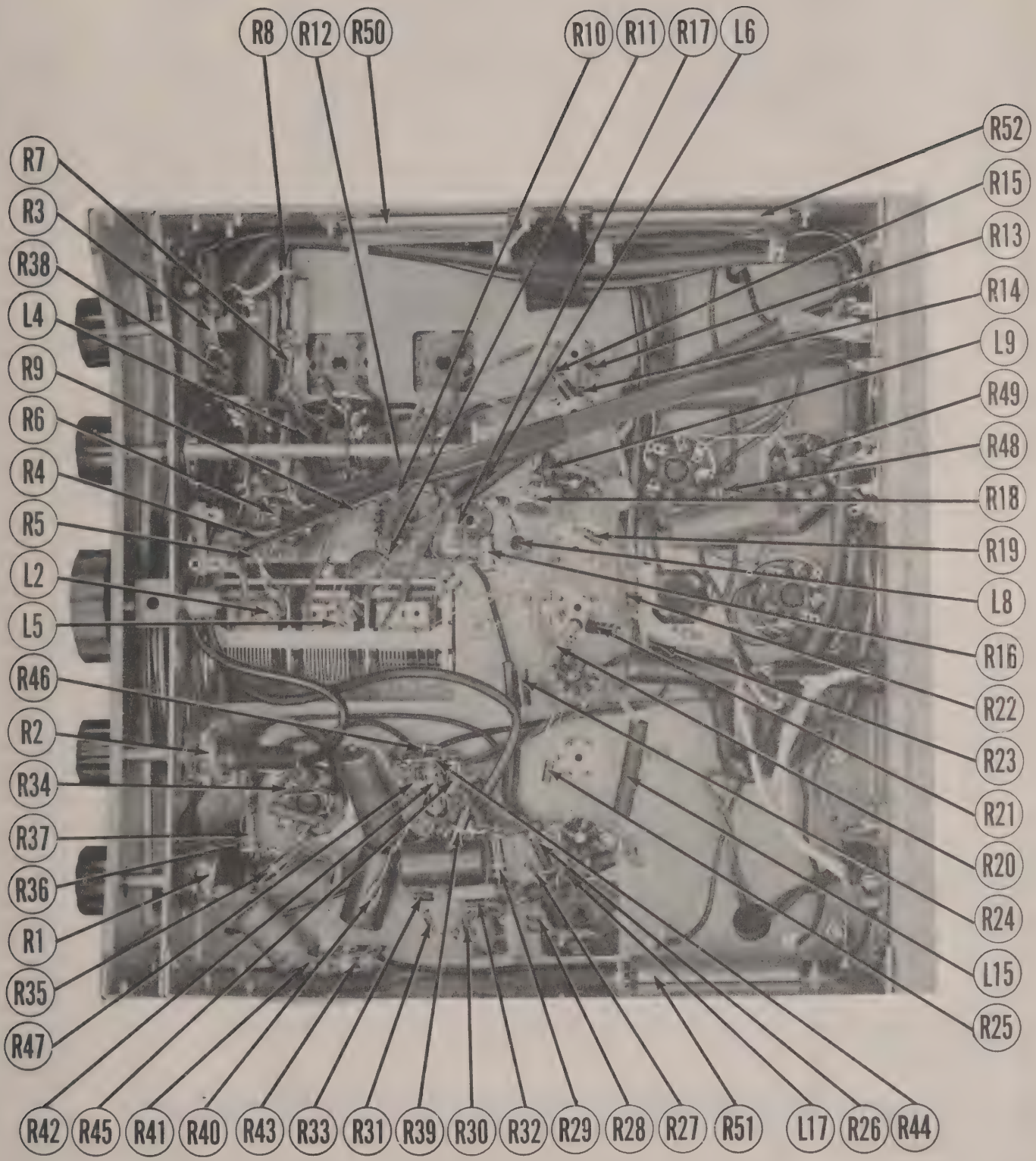

C42
C16
C11
C14
C20
C12
455KC
A3
10.7MC
A16
C21
C8
C43
M4
C18
C3
C15
C22
C7
C5
C46
C9
C45
C6
10.7MC
A14
C10
C34
C13
C1
C19
455KC
A1
C36
C35
C37
C33
C41
C24
C38
C23
C40
10.7MC
A12
C39
C27
C47
C44
C2
C48
C4
A
C32
C31
C29
C28
C30
B
C17
A10
C26
C25
10.7MC
PRI.


R8
R12
R50
R10
R11
R17
L6
R52
R15
R13
R14
L9
R49
R48
R18
R19
L8
R16
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R23
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R20
R24
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R7
R3
R38
L4
R9
R6
R4
R5
L2
L5
R46
R2
R34
R37
R36
R1
R35
R47
R42
R45
R41
R40
R43
R33
R31
R39
R30
R32
R29
R28
R27
R51
L17
R26
R44

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to stator on center AM section of tuning gang. Low side to chassis.	455KC (400∿Mod.)	AM	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	Direct	High side to stator on front AM section of tuning gang. Low side to chassis.	600KC	"	600KC	"	A5, A6,	"
3.	Direct	"	1500KC	"	1500KC	"	A7, A8	" Repeat steps 2 & 3 until no further improvement can be made.
4.	Loop	"	"	"	"	"	A9	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to Pin 1, (Grid), of 6AU6, (V5). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open.	DC probe to Point Ⓐ. Common to chassis.	A10, A11, A12	Adjust for maximum deflection.
6.	"	High side to Pin 1 (Grid), of 6BA6, (V4). Low side to chassis.	"	"	"	"	A13, A14	"
7.	"	High side to Pin 7, (Grid), of 6BE6, (V3). Low side to chassis.	"	"	"	"	A15	"
8.	"	"	"	"	"	DC probe to Point Ⓑ. Common to chassis.	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5.	.01MFD	High side to Pin 1, (Grid), of 6AU6, (V5). Low side to chassis	10.7MC (450KC Swp)	FM	Point of non-interference.	Vert. amp. to Point Ⓐ Low side to chassis.	A10, A11, A12	Disconnect stabilizor capacitor C4. Adjust for maximum amplitude and symmetry as per Fig. 1. Attenuate signal gen. to maintain 3 Volt reading.
6.	"	High side to Pin 1, (Grid), of 6BA6, (V4). Low side to chassis.	"	"	"	"	A13, A14	"
7.	"	High side to Pin 7, (Grid), of 6BE6, (V3). Low side to chassis.	"	"	"	"	A15, A16	"
8.	"	"	"	"	"	Vert. amp. to Point Ⓑ Low side to chassis.	A17	Reconnect capacitor C4. Adjust A17 so 10.7MC occurs at center of crossover lines as per Fig. 2. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
9.	270Ω	High side thru 270Ω to ungrounded FM Ant. terminal. Low side to chassis.	89MC (Unmod)	FM	89MC	DC probe to Point Ⓐ. Common to chassis.	A18	Adjust for maximum deflection.
10.	"	"	"	"	"	"	L2, L5	Expand or compress coil turns for maximum deflection.
11.	"		107MC	"	107MC	"	A19, A20 A21	Adjust for maximum deflection. Repeat steps 8, 9 & 10 until further improvement can be made.

FIG. 1

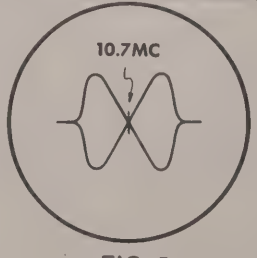


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	92G2871	6BA6	7BK	
V2	FM Oscillator	92B597	6C4	6BG	
V3	FM Mixer-AM Conv	92V4631	6BE6	7CM	
V4	1st. FM-AM IF Amp.	92G2871	6BA6	7BK	
V5	2nd. FM IF Amp. AM Detector	92C2659	6AU6	7BK	
V6	3rd. FM IF Amp.	92C2659	6AU6	7BK	
V7	Ratio Detector	92G2870	6AL5	6BT	
V8	1st. AF Amplifier	92V4632	6SQ7	8Q	
V9	2nd. AF Amplifier Phase Inverter	92A230	6SN7GT	8BD	
V10	Power Output	92E1061	6V6GT	7AC	
V11	Power Output	92E1061	6V6GT	7AC	
V12	Rectifier	92G480	5Y3GT	5T	

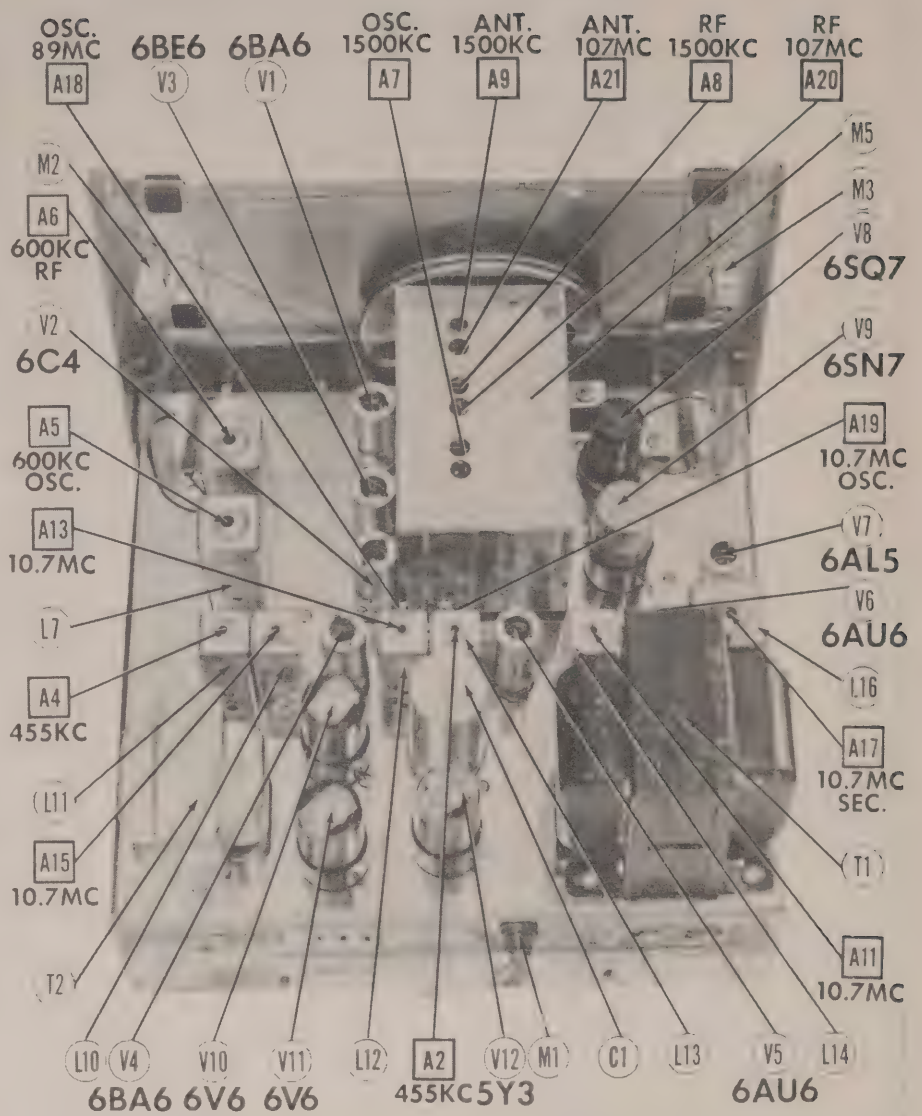
CAPACITORS

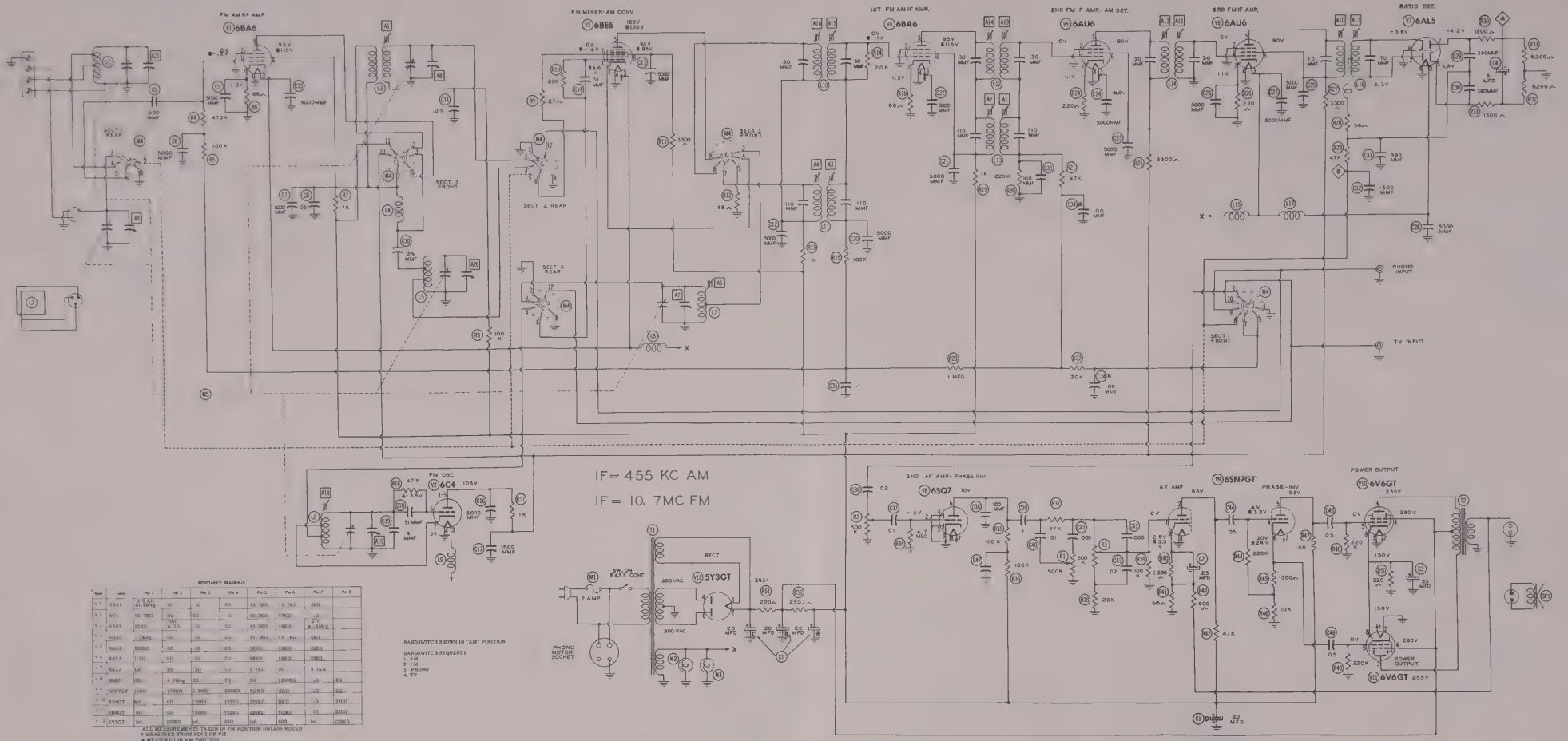
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SCOTT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	20	450	15L3588	AFH4-14		UPT222245		TVL-4763	▲Filter
B	20	450							■ Filter
C	20	450							▲ Decoupling
D	20	450							▲ Decoupling
C2	25	25	15B795	PRS25/25		BR252A		TVA-1205	2nd. AF Amp. Cathode *
C3	25	50	15B795	PRS50/25		BR255A		TVA-1306	Power Output Cathode
C4	5	150	15V4599	PRS150/4		BR415		TVA-1402	Stabilizing Cap.
C5	1500		15L3459	SII500	D6-152	1W5D15	GP2L-152	5HK-D15	RF Coupling
C6	5900		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AVC Filter
C7	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Amp. Decoupling
C8	.05	600	15L3467	P688-05	DF-503	PTE6S5	811-005	6TM-S5	RF Amp. Decoupling
C9	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Amp. Cathode
C10	25		15D3165	SI25	D6-250	5W5Q25	GP1K-250	5GA-Q25	FM RF Coupling
C11	.05	200	15S4221	P288-05	DF-503	PTE4S5		2TM-S5	AVC Filter
C12	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Conv. Plate Decoupling
C13	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AM Osc. Anode
C14	51		15L3458		TCZ-51		NP0-333-510		AM Osc. Grid Cap
C15	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Conv. Fil.
C16	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	FM Osc. Plate
C17	1500		15L3459	SII500	D6-152	1W5D15	GP2L-152	5HK-D15	RF Bypass
C18	51		15L3458		TCZ-51		NP0-333-510		FM Osc. Grid Cap.
C19	4		15V4678				N750K-040		Fixed Trimmer
C20	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AVC Filter
C21	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	1st. IF Amp. Decoupling
C22	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	1st. IF Amp. Filter
D23	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. FM IF Amp. Dec.
C24	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. FM IF Amp. Fil.
C25	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	3rd. FM IF Amp. Dec.
C26	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	3rd. FM IF Amp. Cathode
C27	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	3rd. FM IF Amp. Fil.
C28	5000		15L3462	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Ratio Det. Fil.
C29	390		15B799	1468-0004	D6-391	5W5T4	GP2K-391	1FM-34	Diode Load Cap.
C30	390		15B799	1468-0004	D6-391	5W5T4	GP2K-391	1FM-34	Diode Load Cap.
C31	390		15B799	1468-0004	D6-391	5W5T4	GP2K-391	1FM-34	Diode Load Cap.
C32	1500		15L3459	SII500	D6-152	1W5D15	GP2L-152	5HK-D15	De-Emphasis
C33	100		15L3460	SII100	D6-101	5W5T1	GP1K-101	5GA-T1	Det. RF Filter
C34A	100		15D2923	SII100	D6-101	5W5T1	GP1K-101	5GA-T1	Det. RF Filter
B	100			SII100	D6-101	5W5T1	GP1K-101	5GA-T1	Det. RF Filter
C35	.1	200	15S4298	P288-1	DF-104	PTE4P1		2TM-P1	AVC Filter
C36	.02	200	15U4580	P488-02	DF-203	PTE4S2		2TM-S2	Audio Coupling
C37	.01	400	15L3463	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Audio Coupling
C38	100		15L3460	SII100	D6-101	5W5T1	GP1K-101	5GA-T1	1st. AF Amp. Plate
C39	.1	600	15L3468	P688-1	DF-104	PTE6P1		6TM-P1	Audio Coupling
C40	.01	400	15L3463	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Tone Comp.
C41	.005	600	15H2603	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Tone Comp.
C42	.005	600	15H2603	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Tone Comp.
C43	.02	200	15U4580	P488-02	DF-203	PTE4S2		2TM-S2	Tone Comp.
C44	.05	600	15L3467	P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C45	.05	600	15L3467	P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C46	.05	600	15L3467	P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C47	.1	600	15L3468	P688-1	DF-104	PTE6P1		6TM-P1	RF Bypass
C48	1500		15L3459	SII500	D6-152	1W5D15	GP2L-152	5HK-D15	2nd. FM IF Cathode *

* Not used in all Models

CHASSIS—TOP VIEW





RESISTANCE READINGS

Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
6BA6	5.5Ω KΩ ±1.8Meg	0Ω	1Ω	0Ω	13.7KΩ	13.7KΩ	68Ω	
6C4	13.7KΩ	Inf. VOLT	3Ω	1Ω	13.7KΩ	47KΩ	1Ω 270	
6BE6	22KΩ	∞ 2Ω	1Ω	2Ω	13.7KΩ	16KΩ	±1.4Meg	
6BA6	3Meg	0Ω	1Ω	0Ω	13.7KΩ	13.1KΩ	68Ω	
6AL5	220KΩ	0Ω	1Ω	0Ω	18KΩ	18KΩ	22KΩ	
6AU6	1.2Ω	0Ω	1Ω	0Ω	18KΩ	18KΩ	22KΩ	
6AU6	Inf.	Inf.	2Ω	2Ω	9.7KΩ	0Ω	9.7KΩ	
6SQ7	0Ω	4.7Meg	0Ω	0Ω	0Ω	1200KΩ	1Ω	0Ω
6SN7GT	15KΩ	150KΩ	2.3KΩ	220KΩ	112KΩ	1KΩ	1Ω	0Ω
6V6GT	Inf.	0Ω	13KΩ	122Ω	220KΩ	1KΩ	1Ω	220Ω
6V6GT	0Ω	0Ω	13KΩ	122Ω	220KΩ	112KΩ	1Ω	220Ω
5Y3GT	Inf.	192KΩ	Inf.	85Ω	Inf.	80Ω	Inf.	192KΩ

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS NOTED
† MEASURED FROM PIN 2 OF V12
* MEASURED IN AM POSITION

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			CENTRALAB PART No.	INSTALLATION NOTES
	RESISTANCE	WATTS	SCOTT PART No.	IRC PART No.	CLAROSTAT PART No.		
R1A	500KΩ	½	70V4584	Q11-133	AG-58-S	B-59	Treble Tone Control
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Attach to R1A per instructions
R2A	500KΩ	½	70V4583	Q13-133	AG-60-Z	B-60	Volume Control
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Attach to R2A per instructions
R3A	500KΩ	½	70V4585	Q13-133	AG-60-Z	B-60-S	Bass Tone Control
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Attach to R3A per instructions
C	Switch		Not Req.	76-1	SWB	Not Req.	Attach to R3A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SCOTT PART No.	IRC PART No.	
R4	470KΩ	½	70L3404	BTS-470K	RF Amp. Grid
R5	100KΩ	½	70L3401	BTS-100K	AVC Network
R6	68Ω	½			RF Amp. Cathode - See Note 1 & 2
R7	1000Ω	½	70L3393	BTS-1000	RF Amp. Decoupling
R8	100KΩ	1	70L3401	BTA-100K	AVC Network
R9	27Ω	½	70V4692		Parasitic Suppressor
R10	22KΩ	½	70L3397	BTS-22K	AM Oscillator Grid
R11	3300Ω	½	70L3394	BTS-3300	AM Oscillator Anode
R12	68Ω	½			Converter Cathode - See Note 1
R13	1000Ω	½	70L3393	BTS-1000	Converter Decoupling
R14	22KΩ	½	70L3397	BTS-22K	IF Transformer Shunt
R15	100KΩ	1	70L3401	BTA-100K	AVC Network
R16	47KΩ	1	70L3399	BTA-47K	Oscillator Grid
R17	1000Ω	½	70L3393	BTS-1000	Oscillator Decoupling
R18	68Ω	½			1st. IF Cathode - See Note 1
R19	1000Ω	½	70L3393	BTS-1000	1st. IF Decoupling
R20	220KΩ	½	70L3403	BTS-220K	AM Diode Load
R21	47KΩ	1	70L3399	BTA-47K	AM Diode RF Filter
R22	22KΩ	½	70L3397	BTS-22K	AM Diode RF Filter
R23	1Meg	½	70L3406	BTS-1Meg	AVC Network
R24	220Ω	1	70V4783	BTA-220	2nd. IF Cathode
R25	3300Ω	½	70L3394	BTS-3300	2nd. IF Decoupling
R26	220Ω	1	70V4783	BTA-220	3rd. IF Cathode
R27	3300Ω	½	70L3394	BTS-3300	3rd. IF Decoupling
R28	56Ω 5%	½	70V4628		Balancing - See Note 2
R29	47KΩ	½	70L3399	BTS-47K	De-emphasis
R30	1500Ω	½	70L3525	BTS-1500	Balancing
R31	1500Ω	½	70L3525	BTS-1500	Balancing
R32	8200Ω	½	70L3523	BTS-8200	Ratio Detector Diode Load
R33	8200Ω	½	70L3523	BTS-8200	Ratio Detector Diode Load
R34	4.7Meg	½	70L3530	BTS-4.7Meg	1st. AF Amp. Grid
R35	100KΩ	1	70L3401	BTA-100K	1st. AF Amp. Plate Load
R36	100KΩ	1	70L3401	BTA-100K	1st. AF Amp. Plate Decoupling
R37	47KΩ	1	70L3399	BTA-47K	Tone Compensation
R38	22KΩ	½	70L3397	BTS-22K	Tone Compensation
R39	100KΩ	1	70L3401	BTA-100K	2nd. AF Amp. Grid
R40	2200Ω	½	70L3432	BTS-2200	2nd. AF Amp. Cathode
R41	56Ω	½	70V4628	BW-½-56	2nd. AF Amp. Cathode
R42	47KΩ	1	70L3399	BTA-47K	2nd. AF Amp. Plate Load
R43	560Ω	½	70L3527	BTS-560	Feedback
R44	220KΩ	½	70L3403	BTS-220K	Phase Inverter Grid
R45	1500Ω	½	70L3525	BTS-1500	Phase Inverter Cathode
R46	10KΩ	½	70L3396	BTS-10K	Phase Inverter Cathode
R47	10KΩ	½	70L3396	BTS-10K	Phase Inverter Plate Load
R48	220KΩ	½	70L3403	BTS-220K	Output Grid
R49	220KΩ	½	70L3403	BTS-220K	Output Grid
R50	220Ω	5	70U4717	1 3/4A-225	Output Cathode Wire Wound
R51	220Ω	5	70U4717	1 3/4A-225	Filter
R52	2500Ω	12	70V4718	2D-2500	Filter

Note 1. Some Models may use a 82Ω Resistor in this application.
Note 2. Some Models may use a 47Ω Resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	SCOTT PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC ② .85A.	600VCT ②.125A.	5VAC ② 2.0A.	6.3VAC ② 4.3A	91U4576	PC-8411①	P-3173①	PV-120②

① Add Series Resistor to reduce Plate Voltage
② Drill New Mounting Holes

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SCOTT PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	5KΩ CT	6.8Ω	160Ω CT	.5Ω	91U4577	A-3830②		PCO-80②	② Drill New Mounting Holes

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	SCOTT PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	6.8Ω	85U4709	ST-102 Mod P-12S		
	CONE DIA.	V. C. DIA.				
SP2	11 3/4"	1"				

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	SCOTT PART No.	MEISSNER PART No.	IRC PART No.	
L1	AM Loop Ant.	2.2Ω		1V4594			
L2	FM Ant. Coil	0Ω		20V4625			
L3	AM RF Coil	150Ω	4Ω	20V4620			
L4	Coupling Choke	.4Ω		17V4668			
L5	FM RF Coil	0Ω		20V4626			
L6	Fil. Choke	0Ω		17L3378			
L7	AM Osc. Coil	3.7Ω		20V4621			Tap at .3Ω
L8	FM Osc. Coil	0Ω		20V4627			
L9	Fil. Choke	3Ω		17V4683			
L10	1st. FM IF	1.2Ω	1.2Ω	20V4623			
L11	1st. AM IF	14Ω	14Ω	20V4622			
L12	2nd. FM IF	1.2Ω	1.2Ω	20V4623			
L13	2nd. AM IF	14Ω	14Ω	20V4622			
L14	3rd. FM IF	1.2Ω	1.2Ω	20V4623			
L15	Fil. Choke	0Ω		17L3378			
L16	Ratio Det. Trans.	1.4Ω	.1Ω	20V4624			Tap at .3Ω
L17	Fil. Choke	0Ω		17L3378			

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			SCOTT PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG	3 Amp. 250V	37A162		312003	342001	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					SCOTT PART No.		
M2	Bayonet	6-8	.15	Brown	49A168		Type Number 47
M3	Bayonet	6-8	.15	Brown	49A168		Type Number 47

MISCELLANEOUS

ITEM No.	PART NAME	SCOTT PART No.	NOTES
M4	Switch	89V4630	Function Selector
M5	Tuning Cap	15U4569	(16-512MMF, 33-535MMF, 29-212MMF)
	Knob	47V4603	Tuning
	Knob	47V4604	Control

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL 23M

SYLVANIA
MODELS 22M-1, 23B, M, 24M, 24M-1

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MODELS 22M-1, 23B, M, 24M, 24M-1

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SYLVANIA MODEL 23M

TRADE NAME	Sylvania Models 22M-1, M, M-1(Ch. 1-387-1), 24M (Ch. 1-462-1), 24M-1, M- 3, (Ch. 1-387-1)
MANUFACTURER	Sylvania Elect. Prod., Inc., Colonial Radio & Tel. Div., 254 Rano St., Buffalo, N. Y.
TYPE SET	Television Receiver
TUBES	Twenty Five
POWER SUPPLY	110-120 Volts AC - 60 Cycle — RATING 2.2 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

INDEX

AGC Adjustment 10
Alignment Instructions 6, 7
Horizontal Sweep Circuit Adjustments 10
Parts List and Descriptions ..... 11 thru 14
Photographs
- Cabinet - Rear View 10
- Capacitor and Alignment Identifications 4, 9
- Chassis - Top View 3
- RF Tuner 8
- Resistor and Inductor Identification 15, 16

Resistance Measurements 8
Schematic 2
Tube Placement Charts 5

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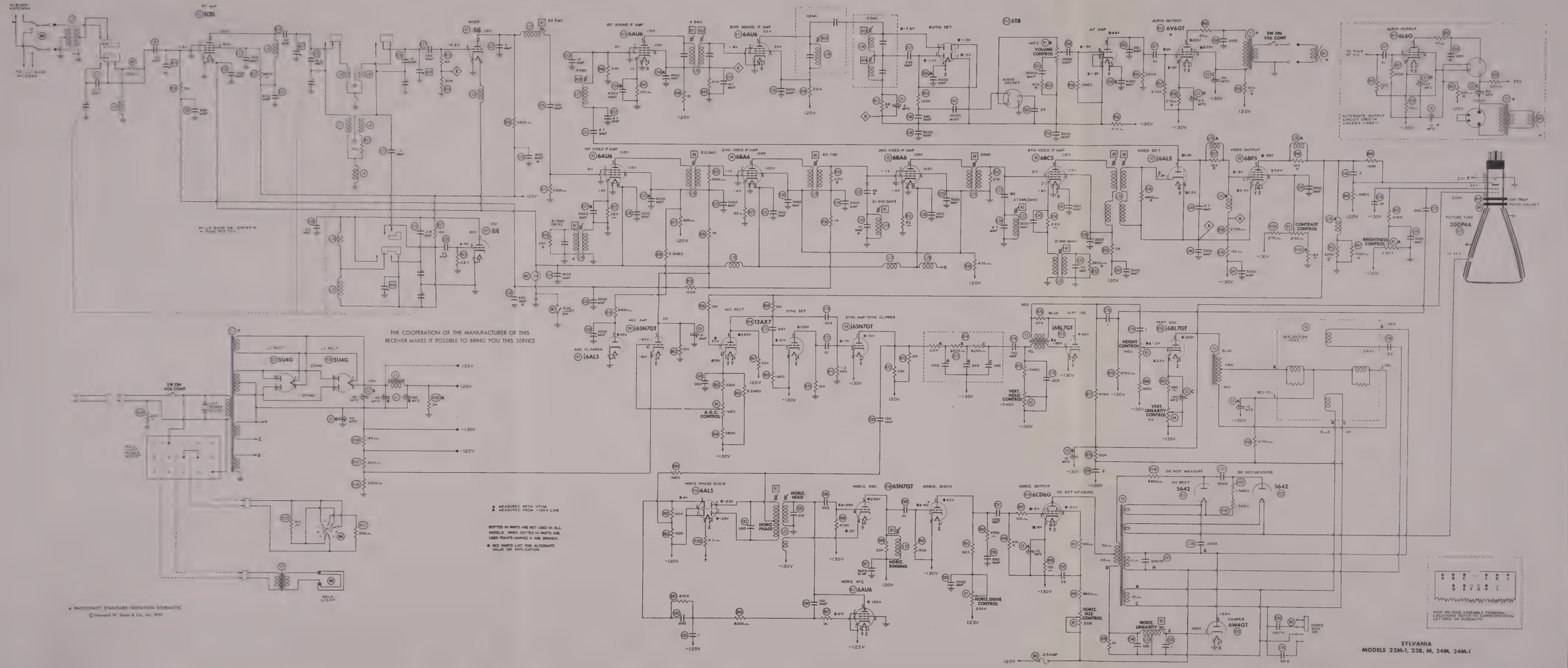
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A MEASURED WITH VTVM
B MEASURED FROM -130V LINE
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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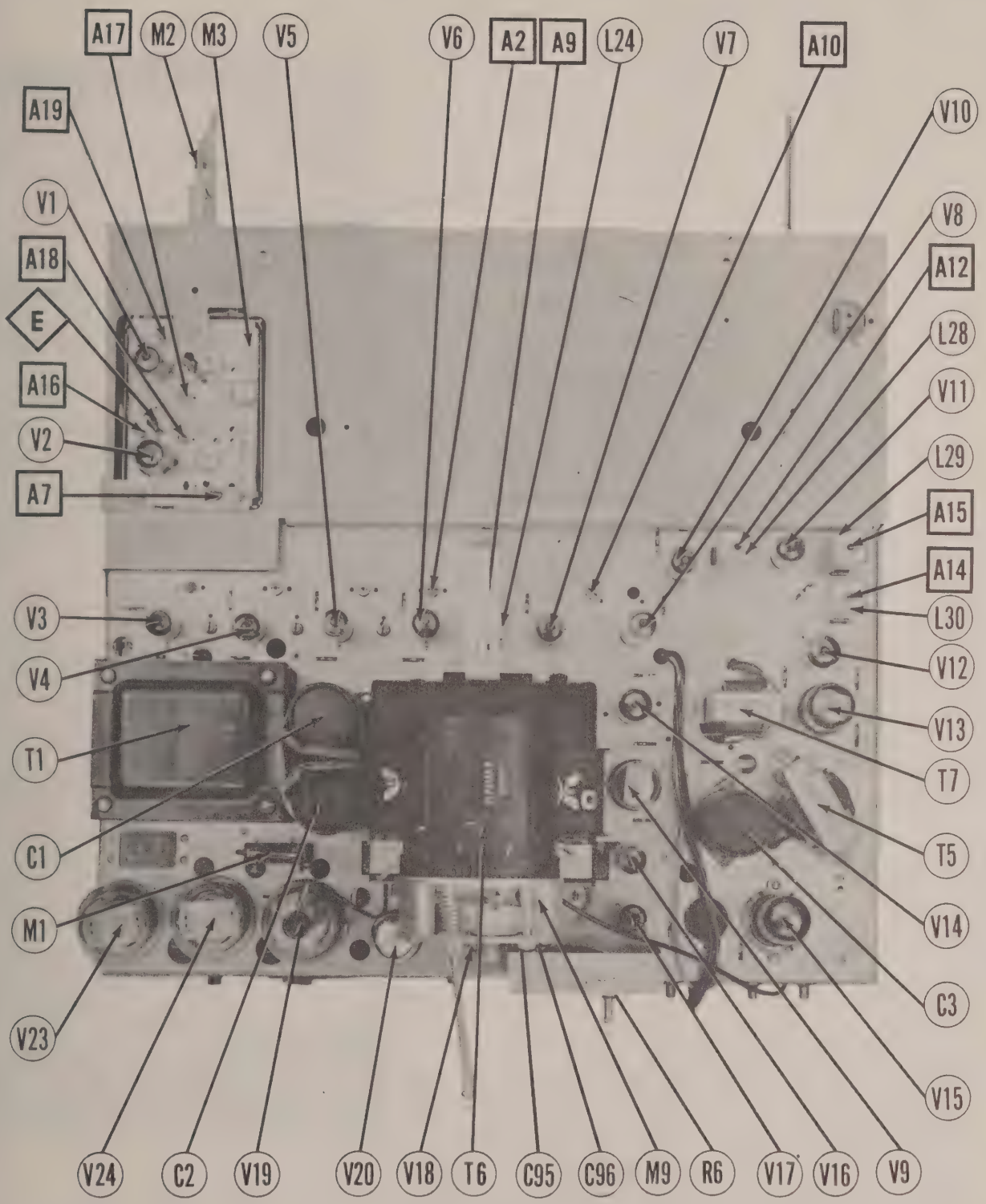
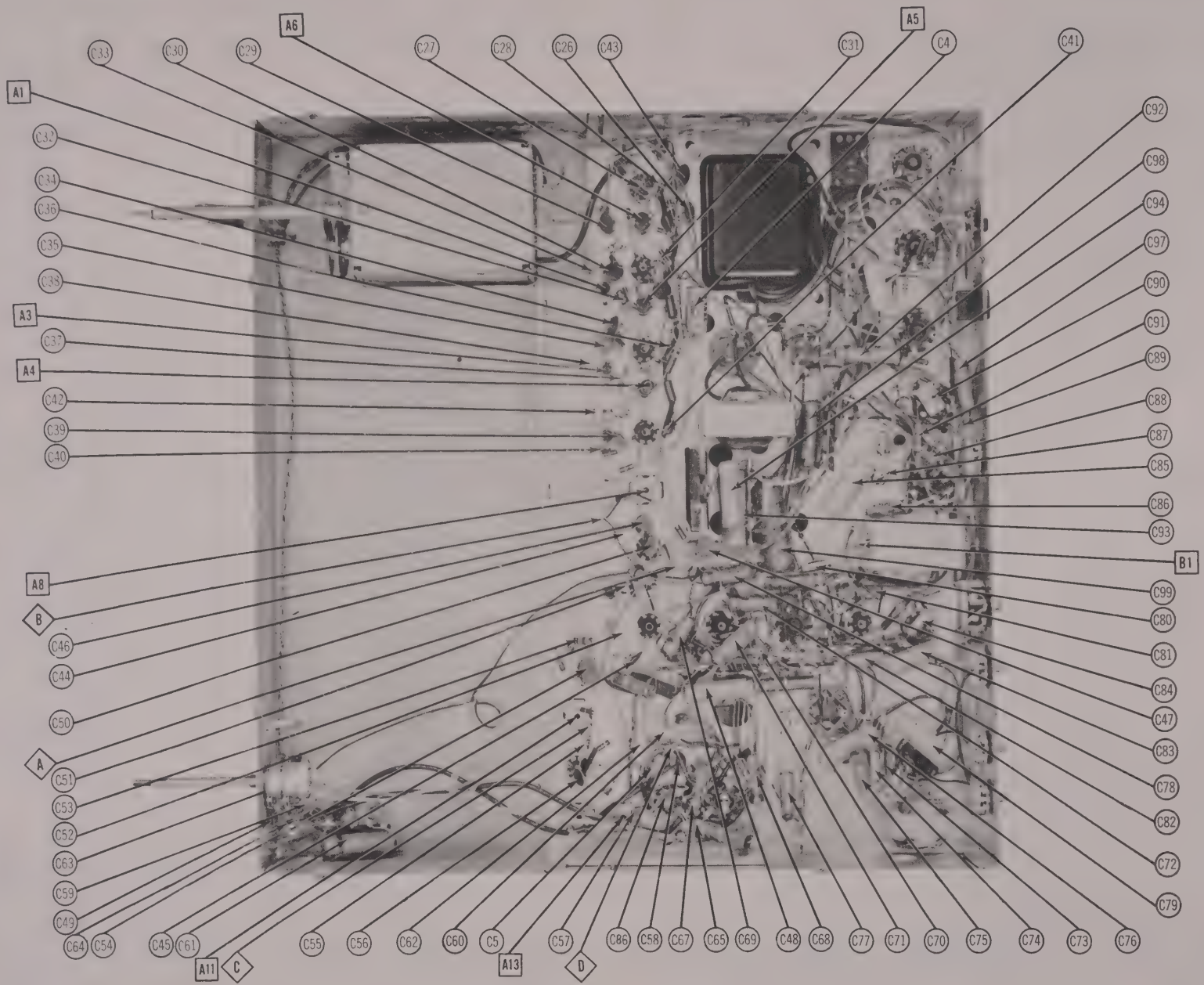
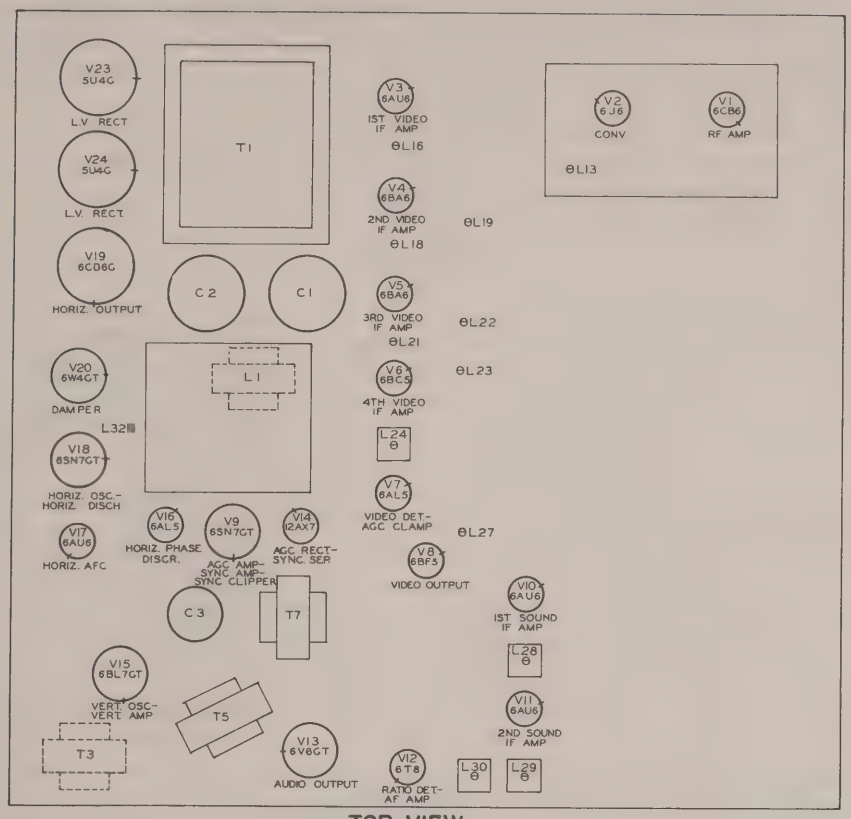


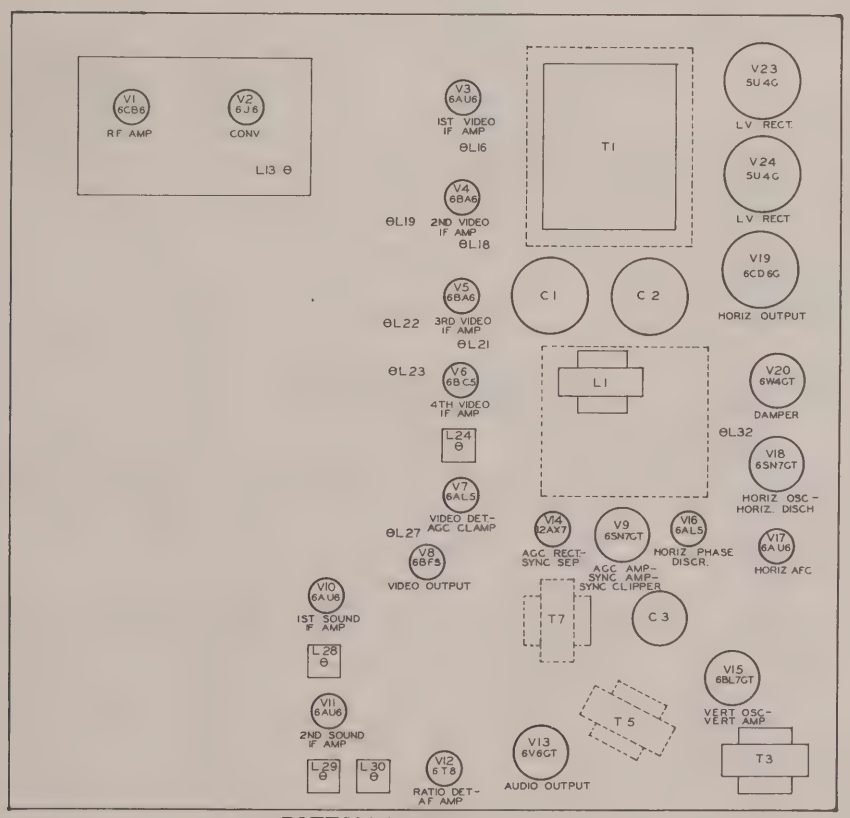
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



TOP VIEW



BOTTOM VIEW

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube, (V2), from its socket and replace it with a 6J6 which has Pin 1 removed, this will disable the local oscillator and prevent the possibility of erroneous indications.
Connect the negative lead of a 3 Volt battery to Pin 5 of V9, connect the positive lead to chassis.
During video IF alignment the common lead of the VTVM is connected to approximately 130 Volts with respect to chassis. Avoid touching or grounding the VTVM case.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	Not used	21.9MC (Unmod.)	Any	Use VTVM DC probe to Point A. Common to Point B.	A1, A2	Adjust for MINIMUM deflection.
2.	"	"	"	27.9MC	"	"	A3	Adjust for MINIMUM deflection.
3.	"	"	"	26.0MC	"	"	A4	Adjust for maximum deflection. Attenuate signal gen. to maintain 1to 2 Volt reading.
4.	"	"	"	22.7MC	"	"	A5	Adjust for maximum deflection. Attenuate signal gen. to maintain 1 to 2 Volt reading.
5.	"	"	"	25.3MC	"	"	A6	Adjust for maximum deflection. Attenuate signal gen. to maintain 1 to 2 Volt reading.
6.	"	"	"	23.5MC	"	"	A7	Adjust for maximum deflection. Attenuate signal gen. to maintain 1 to 2 Volt reading. Recheck trap adjustments.
7.	.005MFD	High side to Pin 1, (Grid), of 6CB5, (V8). Low side to chassis.	25MC (10MC Swp.)	21.9MC 23MC 27MC	"	Vert. Amp. to Point A . Low side to chassis.	A8, A9	Adjust for response curve similar to Fig. 1.
8.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	"					Check for response curve similar to Fig. 2. If necessary retouch A4 through A7 for proper response.

SOUND IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.005MFD	High side to Point A . Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any	Vert. Amp. thru 47KΩ to Point C. Low side to chassis.	A10, A11, A12	Adjust for maximum amplitude and symmetry as per Fig. 3
10.	"	"	"	"	"	Vert. Amp. to Point D. Low side to chassis.	A13, A14, A15	Adjust A13 and A14 so 4.5MC occurs at center of "S" curve as shown in Fig. 4. Adjust A15 for maximum amplitude and straightness of diagonal line.

TUNER ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The use of two marker generators is required to align this tuner. Marker generator No 1 is connected through a 2 or 3 MMF capacitor, across the sweep generator at the antenna terminals. If the sweep generator has a built in marker, it will be used for marker No. 1. The frequency to which marker No. 1 is tuned will be indicated in the table by an asterisk (*). Marker generator No. 2 is connected to an ungrounded tube shield slipped over the converter tube. The frequency to which marker generator No. 2 is tuned will be indicated in the table by a dagger (†).
During tuner alignment it is necessary to switch the oscilloscope between the detector circuit (Fig. 5), and the 10KΩ resistor connected to Point E . Therefore it is recommended that a single pole double throw switch, mounted as closely as possible to the oscilloscope terminals be used to switch the oscilloscope input. All connecting leads should be shielded and kept as shortas possible.
Leave the 3 Volt bias connected as during video IF alignment.
The points where the oscillator alignment is made occur at the points where the cam connected to the tuning shaft just begins to actuate the slide band switch. Some mechanical overshoot may appear at these points, in that case, back off the tuning control until the tuning gang is fully meshed or fully open as the case may be.
Remove the second video IF Amp. (V4), from its socket.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

LOW BAND OSCILLATOR ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp.)	*56.75MC †21.9MC	Tuning gang fully closed. (slide switch forward)	Vert. Amp. thru detector to Pin 1, (Grid), of V4. Low side to chassis.	L11	Remove tuner bottom cover. With a non-metallic pick vary L11 turn spacing until markers coincide on response curve as shown in Fig. 6.
12.	"	"	85MC (10MC Swp.)	*84.35MC †26.4MC	Tuning gang fully open. (slide switch forward	"	A16	Adjust until markers coincide as in Step 11. Repeat steps 11 & 12 until oscillator frequency is correct at both ends of the low band range.

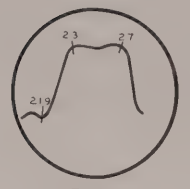


FIG. 1

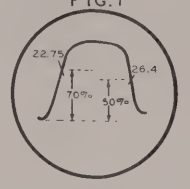


FIG. 2

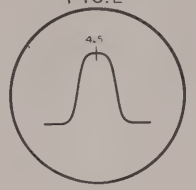


FIG. 3

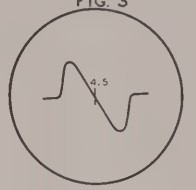


FIG. 4

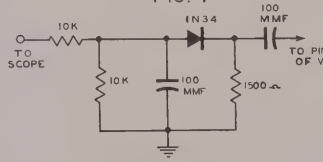


FIG. 5

FIG. 6

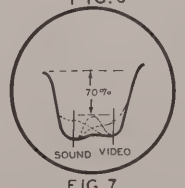


FIG. 7

ALIGNMENT INSTRUCTIONS (CONT.)

HIGH BAND OSCILLATOR ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	177MC (10MC Swp.)	*176.55MC †21.9MC	Tuning gang fully closed. (Slide switch to rear).	Vert. Amp. thru detector to Pin 1, (Grid) of V4. Low side to chassis.	L10	With a non-metallic tool vary turn spacing of L10 until markers coincide on response curve as in Step 11.
14	"	"	213MC (10MC Swp.)	*215.75MC †26.4MC	Tuning gang fully open (slide switch to rear)	"	C19	Adjust turns of wire around C19 until markers coincide as in step 11. After C19 is adjusted it may be necessary to read-adjust L10 to obtain marker coincidence. Replace bottom cover. If markers separate make compromise adjustment of L10 so markers coincide with bottom cover in place. Repeat steps 13 & 14 until oscillator frequency is correct at both ends of high band range. Recheck low band range.

LOW BAND RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp.)	*59.75MC †21.9MC	2	Vert. Amp. thru detector to Pin 1 (Grid), of V3. Low side to chassis.		Turn tuning control until markers coincide on response curve.
16.	"	"	"	*55.25MC *59.75MC	"	Vert. Amp. thru 10KΩ to Point E. Low side to chassis.	L7, L8 L9	Connect a 150Ω resistor across R10. Adjust turns of L7 and L8 for response curve within the limits of Fig. 7. Adjust turns of L9 until bandpass is slightly wider than necessary to maintain markers at peaks of response curve.
17.	"	"	85MC (10MC Swp.)	*87.75MC †21.9MC	6	Vert. Amp. thru detector to Pin 1 of V3. Low side to chassis.		Turn tuning control until markers coincide on response curve.
18.	"	"	"	*83.25MC *87.75MC	"	Vert. Amp. thru 10KΩ to Point E. Low side to chassis.	A17, A18	Adjust for response curve within the limits of Fig. 7.
19.	Repeat Step 16							
20.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead	57MC (10MC Swp.)	*55.25MC *59.75MC	2	"	L2	Remove 150Ω resistor from across R10. Adjust turn spacing of L2 secondary until peaks of response are equal and a slight change causes peaks to rock evenly.
21.	Repeat Step 18							
22.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	85MC (10MC Swp.)	*83.25MC *87.75MC	6	"	A19	Adjust for equal amplitude of peaks. Repeat step 20.

HIGH BAND RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
23.	Two 120Ω carbon	Across antenna terminals with 120Ω in each lead.	177 MC (10MC Swp)	*179.75MC †21.9 MC	7	Vert. Amp. through detector to pin 1 of V3. Low side to chassis.		Turn tuning control until markers coincide on response curve.
24.	"	"	"	*175.25MC *179.75MC	7	Vert. Amp. through 10KΩ to point E. Low side to chassis.	L5, L6	Connect 150Ω resistor across R10. Adjust L5 and L6 by pushing the coils onto or off of the brass studs for response similar to fig. 7 L5 and L6 are properly adjusted when a slight change of either causes a shift of the response curve without noticeable changeof band width. Band width is adjusted by altering the position of L5 and L6 ground leads past the cutout in the shield partitionand should be adjusted so response is slightly wider than necessary to keep markers at peaks of response.
25.	"	"	213MC (10 MC Swp.)	*215.75MC †21.9MC	13	Vert. Amp. through detector to pin 1 of V3 Low side to chassis		Turn tuning control until markers coincide on response curve.
26.	"	"	"	*211.25MC *215.75MC	13	Vert. Amp. through 10KΩ to point E. Low side to chassis.		Check for response curve similar to fig. 7. If necessary make compromise adjustment of L5 and L6. At this point it is advisable to check all high band channels to see if further compromise adjustment of L5 and L6 is necessary to bring all high channels within the limits of fig. 7.
27.	Repeat Steps 24							
28.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	177MC (10MC Swp.)	175.25 179.75MC	7	Vert. Amp. thru 10KΩ to Point E. Low side to chassis.	L3	Remove 150Ω resistor from across R10. Adjust turn spacing of L3 until peaks of response are of equal height.
29.	Repeat Steps 26							
30.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	*211.25MC *215.75MC	13	"		Check to see if channel 13 response is tilted beyond the limits of Fig. 7. If necessary make compromise adjustment of L3 so tilt on channels 7 & 13 are within the limits of Fig. 7. Replace tuner bottom cover and check response curves on channels 7 & 13. Make compromise adjustments of L5, Lo & L3 as needed to obtain proper response on channels 7 & 13 with bottom cover in place.

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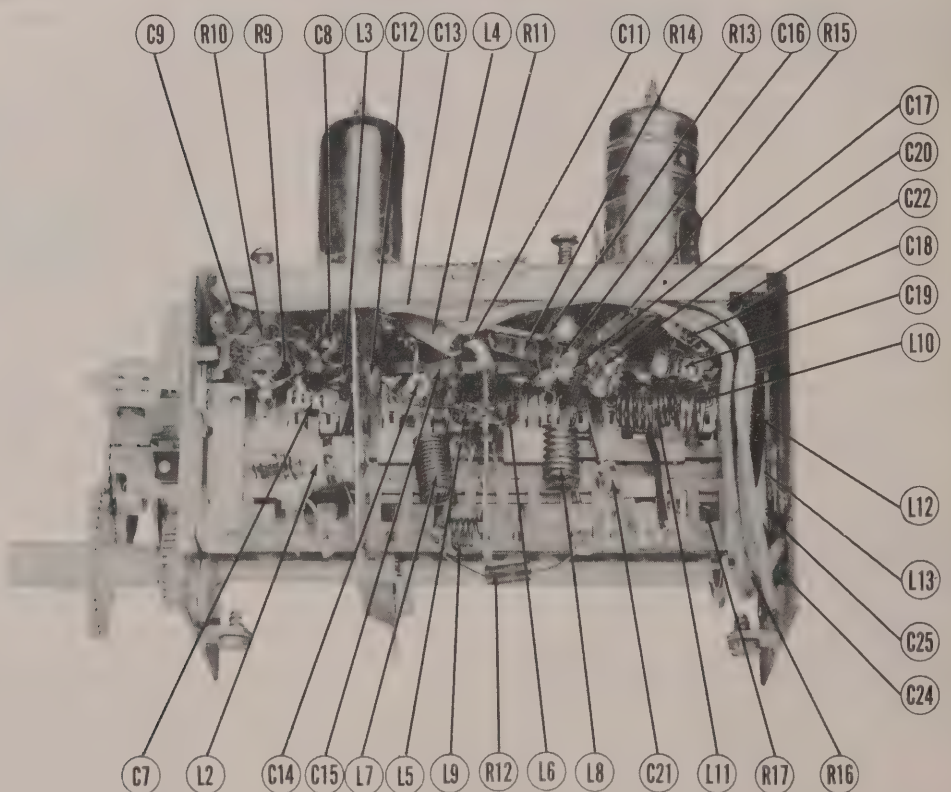
RESISTANCE MEASUREMENTS

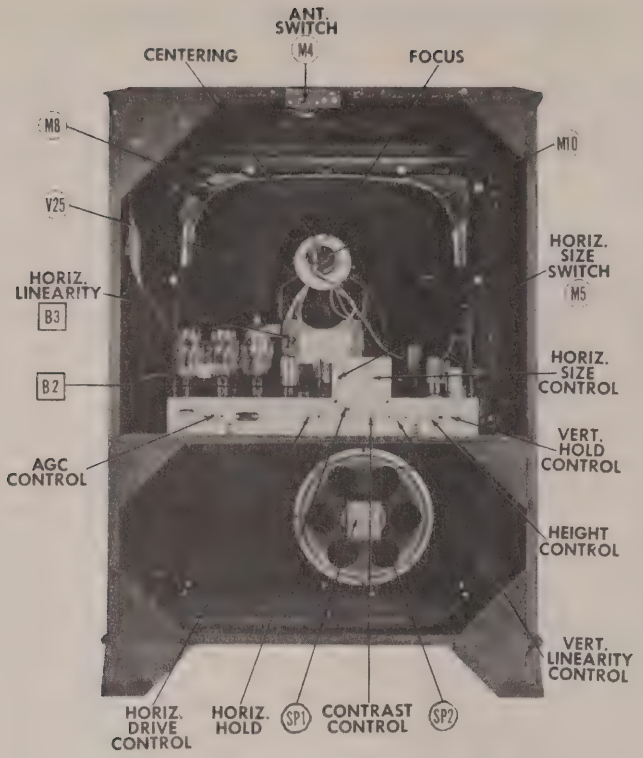
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	120KΩ	0Ω	0Ω	,1Ω	†37Ω	†6.8KΩ	0Ω		
V 2	6J6	†10KΩ	†6.8KΩ	.1Ω	0Ω	110KΩ	22KΩ	0Ω		
V 3	6AU6	3.3KΩ	0Ω	0Ω	.1Ω	†850Ω	†850Ω	220Ω		
V 4	6BA6	11KΩ	0Ω	0Ω	.1Ω	†500Ω	†500Ω	82Ω		
V 5	6BA6	11KΩ	0Ω	0Ω	.1Ω	†500Ω	†500Ω	82Ω		
V 6	6BC5	.8Ω	220Ω	0Ω	.1Ω	†1KΩ	†1KΩ	220Ω		
V 7	6AL5	■100Ω	115KΩ	.1Ω	0Ω	0Ω	■100Ω	■2.8KΩ		
V 8	6BF5	■2.8KΩ	■100Ω	■.1Ω	■0Ω	4KΩ	■320Ω	■2.8KΩ		
V 9	6SN7GT	1.2Meg	†11KΩ	■0Ω	■900KΩ	10KΩ	3KΩ	■0Ω	■.1Ω	
V 10	6AU6	47KΩ	0Ω	0Ω	.1Ω	†1KΩ	†1KΩ	100Ω		
V 11	6AU6	47KΩ	0Ω	.1Ω	0Ω	†22KΩ	†22KΩ	0Ω		
V 12	6T8	INF.	■68KΩ	INF.	■.1Ω	■0Ω	■470Ω	■470Ω	■15Meg	220KΩ
V 13	6V6GT	INF.	■.1Ω	†1.1KΩ	†500Ω	■470KΩ	†1.1KΩ	■0Ω	■270Ω	
V 14	12AX7	12KΩ	■1Meg.	■0Ω	■.1Ω	■.1Ω	†33KΩ	14KΩ	■1.1Meg	■0Ω
V 15	6BL7GT	■1.7Meg	#570KΩ	■0Ω	■1.2Meg	#4.7KΩ	■1.5KΩ	■0Ω	■.1Ω	
V 16	6AL5	■0Ω	■1.1Meg	■2.1Ω	■.1Ω	■200KΩ	■0Ω	■1.1Meg		
V 17	6AU6	■670KΩ	■180Ω	■.1Ω	■0Ω	42Ω	0Ω	■180Ω		
V 18	6SN7GT	■150KΩ	†210KΩ	■0Ω	■470KΩ	†75Ω	■10Ω	■.1Ω	■0Ω	
V 19	6CD6G	†15KΩ	■0Ω	■150Ω	■470KΩ	■470KΩ	INF.	■.1Ω	†15KΩ	Top Cap #37Ω
V 20	6W4GT	■470KΩ	INF.	170KΩ	†37Ω	†50Ω	†210KΩ	0Ω	.1Ω	
V 21	5642	Plate #6.8KΩ	INF.	INF.						
V 22	5642	Plate #INF.	INF.	INF.						
V 23	5U4G	INF.	3.1KΩ	INF.	■8Ω	INF.	■7.5Ω	INF.	3.1KΩ	
V24	5U4G	INF.	3.1KΩ	■1.1Meg	■8Ω	INF.	■7.5Ω	■0Ω	3.1KΩ	
V 25	20DP4A	0Ω	■1.6Meg	Pin 10 #100KΩ	Pin 11 †170KΩ	Pin 12 .1Ω				

ALL CONTROLS SET FOR NORMAL OPERATION
† MEASURED FROM PIN 8 of V23 & 24
#MEASURED FROM PIN 3 OF V20
■ MEASURED FROM - 130VDC LINE



RF TUNER



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR CHECK

Turn the set on and tune in a TV station, preferably a test pattern, and turn the horizontal hold adjustment to synchronize the picture.
Switch to another channel and back again. The picture should pull back into synchronization.
Turn the set off for about five minutes and then back on. The picture should pull back into synchronization.
Check the setting of the horizontal drive control as outlined under horizontal linearity adjustments.
Increase the brightness and decrease the contrast until the normally blanked edges of the raster are visible. There should be approximately 1/8" of blanking signal at the edges of the raster.

SLIGHT RETOUCH ADJUSTMENTS

If the receiver failed the above check it may be possible to correct it with a slight retouch adjustment.
Tune in a station and adjust the tuning control for best picture quality.
Adjust the contrast and brightness controls for a normal picture.
Remove the horizontal phase discrimination (V16) from its socket.
Adjust the horizontal hold adjustment until the picture moves back and forth across the raster with the blanking bar vertical.
Replace V16 and repeat the horizontal oscillator check If the receiver still will not pass the check proceed with complete horizontal oscillator alignment.

COMPLETE HORIZONTAL OSCILLATOR ALIGNMENT

Turn the core of the "ringing coil" (B2) fully out, (counter-clockwise) and short R92.
With the horizontal slug B3 set for approximately the correct picture width and the horizontal linearity slug (B4) adjusted for best linearity, turn the horizontal drive control fully counter-clockwise. Slowly turn the drive clock-wise until crowding is visible in the center of the picture. Now turn the drive control back (counter-clockwise) just enough to remove the crowding On some chassis it may not be possible to obtain crowding, in that case leave the control at maximum clockwise.
Remove V16 from its socket.
Carefully turn the horizontal hold adjustment until the picture moves back and forth with the blanking bars vertical.
Replace V16 in its socket.
Increase the brightness and decrease the contrast until the normally blanked edges of the raster are visible.
Adjust the horizontal phasing slug B1 until 1/8" of blanking appears at the edge of the raster.
Recheck the free running of the oscillator and if necessary readjust the horizontal hold adjustment.
Remove the short from R92 and adjust the ringing coil until 1/8" of blanking again appears at the edge of the raster.
Check the operation of the oscillator circuit as follows:
Slowly turn the horizontal hold adjustment in either direction until the picture falls out of synchronization. The number of sloping bars at this point should not exceed six. Slowly turn the adjustment screw back towards the original setting and carefully note the least number of bars present just before the picture pulls into synchronization. The least number of bars present must not be less than three or more than five. Repeat the check of horizontal oscillator.
If the set fails either the oscillator check or the final check above, repeat the entire horizontal oscillator alignment.

HORIZONTAL LINEARITY ADJUSTMENTS

Turn the horizontal drive control clock-wise until crowding is visible in the center of the picture and the counter-clockwise just enough to remove the crowding.
If no crowding is obtained leave the control at maximum clockwise
Turn the horizontal size control to fully clockwise.
Turn the horizontal size switch to the position which gives proper width with the size control nearest fully clockwise.
Adjust the horizontal linearity slug B3 until the picture is symmetrical from left to right.

AGC ADJUSTMENT

Connect an antenna, turn the set on and turn to an unused channel.
Set the contrast control to the mid-position of its range.
Turn the AGC threshold control to fully clockwise.
Connect a VTVM between pin 5 of V19 and chassis. Adjust the threshold control until VTVM reads negative 1 volt. NOTE: On some receivers the closest approach to this setting will be fully clockwise.
With the AGC control set as above, turn the contrast control to approximately 7/8 of maximum and tune in the strongest available station.
Again read the VTVM. If the reading is less than two volts negative leave the threshold control as set.
If the reading is more than two volts negative, slowly turn the threshold control counter-clockwise while observing the picture. The picture will get darker and then finally start to fall out of synchronization as evidenced by a sudden shift or jittering in the picture. Do not turn beyond this point.
Back off (clockwise) slowly on the control to a point just slightly beyond the point where the picture holds synchronization without flutter.
Turn the volume control to approximately normal. If intercarrier buzz is objectional back off the AGC control until the buzz ceases to be objectional.
If more than a slight decrease is required recheck sound IF alignment

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		SYLVANIA PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6CB6	6CB6	7CM	
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF Amp.	6AU6	6AU6	7BK	
V4	2nd. Video IF Amp.	6BA6	6BA6	7BK	
V5	3rd Video IF Amp.	6BA6	6BA6	7BK	
V6	4th Video IF Amp.	6BC5	6BC5	7BD	
V7	Video Detector AGC Clamp.	6AL5	6AL5	6BT	
V8	Video Output	6BF5	6BF5	7BZ	
V9	AGC Amplifier - Sync. Amplifier - Sync. Clipper	6SN7GT	6SN7GT	8BD	
V10	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V11	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V12	Ratio Detector - AF Amplifier	6T8	6T8	9E	
V13A	Audio Output	6V6GT	6V6GT	7AC	
B	Audio Output	6L6G	6L6G	7AC	
V14	AGC Rectifier - Sync. Separator	12AX7	12AX7	9A	
V15	Vert. Oscillator - Vert. Amplifier	6BL7GT	6BL7GT	8BD	
V16	Horizontal Phase Discriminator.	6AL5	6AL5	6BT	
V17	Horizontal AFC	6AU6	6AU6	7BK	
V18	Horiz. Oscillator - Horiz. Discharge	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6CD6G	6CD6G	5B7	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rectifier	5642	5642	5642	
V22	HV Rectifier	5642	5642	5642	
V23	LV Rectifier	5U4G	5U4G	5T	
V24	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA			RTMA BASE TYPE	NOTES
	SYLVANIA PART No.	SYLVANIA PART No.	THOMAS PART No.		
V25	20DP4A	20DP4A		12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SYLVANIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	40	350	161-2003	AFH2-64		UPT44445		TVL-2675	▪ Filter
B	80	350							▲ Filter
C2A	10	450	161-4002	AFH4-109		UPT424		TVL-4707	▪ Horiz. Output Cathode
B	40	350							■ Filter
C	60	350							▲ Audio Output Dec.
D	25	25							Audio Output Cathode
C3A	10	450	161-4003	AFH4-107		UPT411		TVL-4705	▪ Decoupling
B	10	450							■ Decoupling
C	100	50							▲ Vertical Amp. Cathode
D	60	200							Bias Filter
C4	10	25	161-1000	PRS25/10		BR102A		TVA-1204	AGC Filter
C5	2	50	161-1001	PRS150/4		BBR2-50T		TVA-1301	Stabilizing Cap.
C6	10	350	161-1007	PRS350/12		BR1235A		TVA-1604	Audio Output Screen †
C7	21.5						NP0K-21R5		Fixed Trimmer
C8	100			SI100	D6-101		GP1K-101	5GA-T1	RF Coupling
C9	800			BPD-0008	DD-801		801-001	5HK-D1	AGC Filter
C10	800			BPD-0008	DD-801		801-001	5HK-D1	AGC Filter
C11	800			BPD-0008	DD-801		801-001	5HK-D1	RF Amp. Plate Dec. *
C12	1000		166-1000D	BPD-001	DD-102		801-001	5HK-D1	RF Amp. Screen Bypass
C13	1000		166-1000D	BPD-001	DD-102		801-001	5HK-D1	RF Amp. Filter
C14	100			SI100	D6-101		GP1K-101	5GA-T1	RF Coupling
C15	10.5						NP0K-10R5		Fixed Trimmer
C16	10			SI10NP0	TCZ-10		NP0K-100	5TCC-Q1	Fixed Trimmer
C17	100			SI100	D6-101		GP1K-101	5GA-T1	RF Coupling
C18	.59						NP0K-R59		Fixed Trimmer
C19	12.8						N750K-12R8		Fixed Trimmer
C20	33			SI33NP0	TCZ-33		NP0L-330	5TCC-Q33	Oscillator Grid Cap.
C21	1.5			SI1.5NP0	TCZ-1.5		NP0K-1R5		Oscillator Coupling
C22	5						N330K-050		Fixed Trimmer
C23	800			BPD-0008	DD-801		801-001	5HK-D1	RF Bypass *
C24	1000		166-1000D	BPD-001	DD-102		801-001	5HK-D1	Filter Bypass
C25	100			SI100	D6-101		GP1K-101	5GA-T1	IF Coupling
C26	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AGC Filter
C27A	4000		168-0003D	BPD-2X004	D6-402	1D5D4	822-004	5HK-2D4	1st. Video IF Dec.
B	4000				D6-402	1D5D4			1st. Video IF Cathode
C28	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	5HK-D1	1st. Video IF Filter
C29	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AGC Filter
C30	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. Video IF Dec.
C31	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	5HK-D1	2nd. Video IF Filter
C32	.68		168-0004P		TCZ-.68		NP0K-R68		IF Coupling *
C33	10		166-0010P	SI10NP0	TCZ-10		NP0K-100	5TCC-Q1	Fixed Trimmer †
C34	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	AGC Filter
C35	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	3rd. Video IF Dec.
C36	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	5HK-D1	3rd. Video IF Filter
C37	.68		168-0004P		TCZ-.68		NP0K-R68		IF Coupling
C38	4.7		168-0008N	SI4.7NP0	TCZ-4.7		NP0K-4.7		Fixed Trimmer
C39	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	4th. Video IF Dec.
C40	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	4th. Video IF Cathode
C41	1000		166-1000D	BPD-001	DD-102	1W5D1	801-001	5HK-D1	4th. Video IF Filter
C42	50		168-0009N	SI50NP0			NP0-333-500		Fixed Trimmer
C43	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass
C44	4.7		168-0008N	SI4.7NP0	TCZ-4.7		NP0K-4R7		Video Det. Filter
C45	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Video Output Screen
C46	5000		166-5000D	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Bias Filter

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP	RATING VOLT	SYLVANIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C47	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	Bias Filter
C48	.2	200	162-0602	P488-22		GT4P2		2TM-P22	Video Coupling
C49	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	Brightness Cont. Shunt
C50	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	AGC Filter
C51	4.7		168-0008N	SI4.7NP0	TCZ-4.7		NP0K-4R7		Sound IF Coupling
C52	4.7		168-0008N	SI4.7NP0	TCZ-4.7		NP0K-4R7		Voltage Divider
C53	10		166-0010P	SI10NP0	TCZ-10		NP0K-100	5TCC-Q1	1st. Sound IF Grid
C54A	4000		168-0003D	BPD-2X004	D6-402	ID5D4	822-004	5HK-2D4	1st. Sound IF Dec.
B	4000				D6-402	ID5D4			1st. Sound IF Cathode
C55	47		166-0047N	SI47	D6-470	5W5Q5	GP1K-470	5GA-Q47	2nd. Sound IF Grid
C56	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	2nd. Sound IF Dec.
C57	250		166-0250P	SI250	D6-251	5W5T25	GP2K-251		Diode Load Cap.
C58	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	Bias Filter
C59	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	Bias Filter
C60	680	500	163-0680	1479-0007	D6-681	1W5T7	GP2K-681	1FM-37	De-Emphasis
C61	.25	200	162-02035	P488-25		GT2P25		2TM-P25	Isolation
C62	10000		168-0002N	SI10000	D6-103	ID3S1	GP2-333-103	5HK-S1	Audio Coupling
C63	10000		¶190-0006	SI10000	D6-103	ID3S1	GP2-333-103	5HK-S1	Tone Comp.
C64	10000		168-0002N	SI10000	D6-103	ID3S1	GP2-333-103	5HK-S1	Audio Coupling
C65	.00	500	163-0100	1468-0001	D6-101	5W5T1	GP1K-101	1FM-31	AF Amp. Plate
C66A	4000		168-0003D	BPD-2X004	D6-402	ID5D4	822-004	5HK-2D4	AFAmp. Filter
B	4000				D6-402	ID5D4			Filter Bypass
C67	01	600	162-0611	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Audio Coupling
C68	.005	600	162-0625	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Output Plate
C69	.003	600	162-0623	P688-003	D6-302	PTE6D3	GP2-333-302	6TM-D3	AGC Rect. Cathode
C70	.005	600	162-0625	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Sync. Coupling
C71	.047	200	162-04147	P288-047	DF-503	PTE4S5		2TM-S47	Sync. Coupling
C72	.01	600	162-0611	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Sync. Coupling
C73A	.002			P688-002		PTE6D2	GP2-333-202		Vert. Integrator Net.
B	.005		¶190-0007	P688-005	♦PC-100	PTE6D5	GP2-333-502	♦101C1	Vert. Integrator Net.
C	.005			P688-005		PTE6D5	GP2-333-502		Vert. Integrator Net.
C74	750	500	163-0750	1464-00075					Vert. Sweep Coupling
C75	.003	600	162-0623	P688-003	D6-302	PTE6D3	GP2-333-302	6TM-D3	Vert. Discharge
C76	.1	400	162-0601	P488-1	DF-104	PTE4P1		4TM-P1	Vert. Discharge
C77	.003	600	162-0623	P688-003	D6-302	PTE6D3	GP2-333-302	6TM-D3	Vert. Sweep Coupling
C78	.01	600	162-0611	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Integrator Net.
C79	.1	400	162-0601	P488-1	DF-104	PTE4P1		4TM-P1	Vert. Sweep Coupling
C80	500	500	163-0100	1468-0001	D6-101	5W5T1	GP1K-101	1FM-31	Horiz. Sync. Coupling
C81	.005	600	162-0625	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Fixed Trimmer
C82	.005	600	162-0625	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	AFC Filter
C83	.1	200	162-0601	P288-1	DF-104	PTE4P1		2TM-P1	AFC Filter
C84	100	500	163-0100	1468-0001	D6-101	5W5T1	GP1K-101	1FM-31	Horiz. Feedback
C85	.015	400	163-0010	P488-015		PTE6S15		6TM-S15	Fixed Trimmer
C86	.002	400	162-04225	P688-002	D6-202	PTE6D2	GP2-333-202	6TM-D2	AFC Coupling
C87	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	RF Bypass
C88	.01	600	162-0611	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Horiz. Sweep Coupling
C89	5000		166-5000D	BPD-005	DD-502	ID5D5	811-005	5HK-D5	RF Bypass
C90	680	500	163-0680	1479-0007		2R5T7		MS-37	Horiz. Discharge
C91	1000		166-1000P	SI1000	D6-102	1W5D1	GP2L-102	5HK-D1	Horiz. Sweep Coupling
C92	.047	400	162-04147	P488-047	DF-503	PTE4S5		4TM-S5	Horiz. Output Screen
C93	.1	600	162-0601	P688-1	DF-104	PTE6P1		6TM-D1	Damper Filter
C94	.03	600	162-0613	P688-03		PTE6S3		6TM-S3	Damper Filter
C95	.00075	1600	162-16375						Fixed Trimmer
C96	.0012	1600	162-16212						Fixed Trimmer
C97	.00075	1600	162-16375						Fixed Trimmer
C98	.22	200	160-03022	P488-22		GT4P2		2TM-P22	Horiz. Sweep Coupling
C99	.2	600	162-0602	684-2		GT6P2			RF Bypass
C100	.0005	10000	160-14350	P10084-0005		PTE10T5		TVM-351	HV Filter
C101	.0005	10000	160-14350	P10084-0005		PTE10T5		TVM-351	HV Doubler

* Not used in all Models
† Used in chassis L-462-1 only
‡ Chassis L-462-1 uses 50 MMF in this application
¶ C63 and R52 are combined in one unit
♦ Items C73A, C73B, C73C, R74A, R74B, R74C are combined in one unit

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	SYLVANIA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
				Concentrikit*			
R1A	2Meg	½	157-0018	B11-139*			Brightness Control - Panel
B	1Meg	½		B13-137X*			Volume Control and Switch Tapped ⓐ 250KΩ
							Rear
C	Shaft			G-202 *			Attach per instructions in "Concentrikit"
D	Switch			76-2 *			Attach per instructions in "Concentrikit"
R2A	1.5Meg	½	153-0014	Q11-138	AG-83-8	AN-75	Vertical Hold Control
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Attach to R2A per instructions
R3A	1Meg	½	153-0001	Q11-137	AG-61-8	AN-69	Height Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R3A per instructions
R4A	5000Ω	½	153-0010	Q11-114	AG-19-8	AN-10	Vertical Linearity Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R4A per instructions
R5	250Ω	2	153-3007	WK-850	43-300	VK-123	Contrast Control - Wirewound
R6	20KΩ	4	153-3009		RTV-185	SVP-982	Horiz. Size Control
R7A	250KΩ	½	153-0007	Q11-130	AG-55-8	AN-50	Horiz. Drive Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R7A per instructions
R8A	1Meg	½	153-0009	Q11-137	AG-61-8	AN-69	AGC Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Attach to R8A per instructions

* Additional Parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	SYLVANIA PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE SPECIFIED
R9	1500Ω			BTS-1500	Antenna Loading
R10	10KΩ			BTS-10K	RF Amp. Grid
R11	6800Ω			BTS-6800	RF Amp. Screen
R12	3Ω 20%				Parasitic Suppressor
R13	10KΩ			BTS-10K	Mixer Grid
R14	100KΩ 20%			BTS-100K	Mixer Grid
R15	22KΩ 20%			BTS-22K	Oscillator Grid
R16	6800Ω			BTS-6800	Mixer Plate Load
R17	10KΩ			BTS-10K	Oscillator Decoupling
R18	6800Ω		181-0682	BTS-6800	AGC Network

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	SYLVANIA PART No.	IRC PART No.	IDENTIFICATION CODES
R19	100KΩ		181-0104	BTS-100K	AGC Network
R20	3.3Meg		181-0335	BTS-3.3Meg	AGC Network
R21	3300Ω		181-0332	BTS-3300	1st. Video IF Grid
R22	220Ω		181-0221	BTS-220	1st. Video IF Cathode
R23	820Ω		181-0821	BTS-820	1st. Video IF Decoupling
R24	33KΩ		181-0333	BTS-33K	Sound Trap Shunt - See Note 1
R25	5600Ω		181-0562	BTS-5600	Video IF Coil Shunt
R26	1000Ω 20%		181-0102	BTS-1000	AGC Network
R27	82Ω		181-0820	BTS-82	2nd. Video IF Cathode
R28	470Ω 20%	1	182-0471	BTA-470	Decoupling
R29	22KΩ		181-0223	BTS-22K	Video IF Coil Shunt - See Note 2
R30	1000Ω 20%		181-0102	BTS-1000	AGC Network
R31	82Ω		181-0820	BTS-82	3rd. Video IF Cathode
R32	5600Ω		181-0562	BTS-5600	Sound Trap Shunt - See Note 1
R33	27KΩ		181-0273	BTS-27K	Video IF Coil Shunt
R34	220Ω		181-0221	BTS-220	4th. Video IF Cathode
R35	1000Ω 20%		181-0102	BTS-1000	4th. Video IF Decoupling
R36	6800Ω 20%		181-0682	BTS-6800	Video IF Coil Shunt - See Note 3
R37	10KΩ 20%		181-0103	BTS-10K	Peaking Coil Shunt - See Note 1
R38	2700Ω 5%		181-02725	BTS-2700 - 5%	Video Peaking
R39	100Ω 20%		181-0101	BTS-100	Decoupling
R40	15KΩ 20%		181-0153	BTS-15K	Peaking Coil Shunt - See Note 4
R41	8200Ω	2	183-0822	BTB-8200	Video Peaking - See Note 5
R42	7500Ω	2	183-0752		Video Peaking - See Note 6
R43	470KΩ 20%		181-0474	BTS-470K	Voltage Divider
R44	180KΩ 5%		181-01845	BTS-180K-5%	Video Coupling
R45	1.2Meg		181-0125	BTS-1.2Meg	Picture Tube Cathode
R46	47KΩ 20%		181-0473	BTS-47K	1st. Sound IF Grid
R47	100Ω 20%		181-0101	BTS-100	1st. Sound IF Cathode
R48	1000Ω 20%		181-0102	BTS-1000	1st. Sound IF Decoupling
R45	47KΩ 20%		181-0473	BTS-47K	2nd. Sound IF Grid
R50	22KΩ 20%		181-0223	BTS-22K	2nd. Sound IF Decoupling
R51	68KΩ		181-0683	BTS-68K	Ratio Detector Diode Load
R52	47KΩ		181-0473	BTS-47K	Tone Compensation - See Note 7
R53	100KΩ 20%		181-0104	BTS-100K	De-emphasis
R54	15Meg 20%		181-0156	BTS-15Meg	Audio Amp. Grid
R55	220KΩ 20%		181-0224	BTS-220K	Audio Amp. Plate Load
R56	470Ω 20%		181-0471	BTS-470	Decoupling
R57	470KΩ 20%		181-0474	BTS-470K	Audio Output Grid
R58	270Ω 20%	1	182-0271	BTA-270	Audio Output Cathode - See Note 8
R59	470Ω	2	183-0471	BTB-470	Audio Output Decoupling - See Note 9
R60	47Ω 20%		181-0470		Parasitic Suppressor
R61	1500Ω 20%		181-0152	BTS-1500	Decoupling - See Note 1
R62	10KΩ 20%		181-0103	BTS-10K	AGC Amp. Plate Load
R63	330KΩ		181-0334	BTS-330K	Voltage Divider
R64	560KΩ		181-0564	BTS-560K	Voltage Divider
R65	2.2Meg 20%		181-0225	BTS-2.2Meg	Voltage Divider
R66	10KΩ 20%		181-0103	BTS-10K	Isolation
R67	33KΩ		181-0333	BTS-33K	AGC Rectifier Plate Load
R68	10KΩ 20%		181-0103	BTS-10K	Isolation
R69	1Meg		181-0105	BTS-1Meg	Sync. Separator Grid
R70	12KΩ		181-0123	BTS-12K	Sync. Separator Plate Load
R71	1.2Meg 20%		181-0125	BTS-1.2Meg	Sync. Amp. Grid
R72	33KΩ		182-0333	BTA-33K	Sync. Amp. Plate Load
R73	15KΩ	2	183-0153	BTB-15K	Sync. Amp. Plate Load
R74A	22KΩ			BTS-22K	Integrator Network - See Note 10
B	8200		190-0007	BTS-8200	Integrator Network
C	8200			BTS-8200	Integrator Network
R75	1.2Meg		181-125	BTS-1.2Meg	Vertical Oscillator Grid
R76	47KΩ 20%		181-0473	BTS-47K	Vertical Oscillator Transformer Shunt
R77	470KΩ		181-0474	BTS-470K	Vertical Oscillator Plate Load
R78	100KΩ 20%		181-0104	BTS-100K	Picture Tube Anode
R79	4700Ω 5%		181-04725	BTS-4700-5%	Integration Network
R80	1Meg		181-0105	BTS-1Meg	Vertical Output Grid
R81	680Ω 20%		181-0681	BTS-680	Vertical Output Cathode
R82	100KΩ		181-0104	BTS-100K	Horizontal AFC Detector Diode Load
R83	100KΩ		181-0104	BTS-100K	Horizontal AFC Detector Diode Load
R84	1Meg		181-0105	BTS-1Meg	Horizontal AFC Detector Diode Load
R85	470KΩ 20%		181-0474	BTS-470K	Horizontal AFC Filter
R86	8200Ω		181-0822	BTS-8200	Horizontal AFC Filter
R87	1000Ω		181-0102	BTS-1000	Horizontal AFC Grid
R88	470KΩ 20%		181-0474	BTS-470K	Horizontal Oscillator Grid
R89	22KΩ 20%		181-0223	BTS-22K	Ringing Coil Shunt
R90	150KΩ 20%		181-0154	BTS-150K	Horizontal Discharge Grid
R91	82KΩ		181-0823	BTS-82K	Horizontal Discharge Plate Load
R92	4700Ω		181-0472	BTS-4700	Horizontal Peaking
R93	100Ω 20%		181-0101		Parasitic Suppressor
R94	470KΩ		181-0474	BTS-470K	Horizontal Output Grid
R95	150Ω	3	189-0020	1 3/4A-150	Horizontal Output Cathode - Wire Wound
R96	6800Ω	3	187-0004		Horizontal Output Screen - Wire Wound
R97	100Ω 20%		181-0101		Parasitic Suppressor
R98	4700Ω 20%	2	183-0472	BTB-4700	Voltage Divider
R99	1000Ω 20%	2	183-0102	BTB-1000	Horizontal Damping
R100	6800Ω		181-0682		Parasitic Suppressor
R101	1.5Meg 20%	2	189-0019		HV Rectifier Load
R102	1.5Meg 20%	2	189-0019		HV Rectifier Load
R103	4.3Ω	5	189-0007		Filament Dropping - Wire Wound
R104	270Ω	5	187-0003		Voltage Divider
R105A	3000Ω	7	185-0001	1 3/4A-3000	Voltage Divider - Wire Wound
B	1185Ω	7		1 3/4A-1200	Voltage Divider - Wire Wound
R106	3300Ω 5%	2	183-03325		Voltage Divider - Wire Wound
R107	3600Ω	3	189-0023		Voltage Divider - Wire Wound
R108	180Ω 5%		181-01815	BTS-180-5%	Voltage Divider
R109	220KΩ 20%		181-0224	BTS-220K	Line Isolation
R110	700Ω	10	187-0007	1 3/4A-700	Voltage Dropping - Wire Wound
R111	500Ω	10	187-0006	1 3/4A-500	Voltage Dropping - Wire Wound

Note 1: Not used in All Models
Note 2: Some Models may use a 27KΩ resistor in this application
Note 3: Some Models may use a 4700Ω resistor in this application
Note 4: Some Models may use a 33KΩ resistor in this application
Note 5: Some Models may use a 6800Ω resistor in this application
Note 6: Some Models may use a 5600Ω resistor in this application
Note 7: Items C63 2nd R52 are combined in one unit.
Note 8: Some Models may use a 150Ω resistor in this application
Note 9: Some Models may use a 330Ω resistor in this application
Note 10: Items C73A, C73B, C73C, R74A, R74B and R74C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	520VCT	5VAC	6.3VAC	141-0013	P-3066 ①		
	ⓐ 2.2A	ⓐ .300A	ⓐ 6A	ⓐ 4.2A	141-0015 ②			
				SEC. 4				
				6.3VAC				
				ⓐ 8A				
T2	117VAC	2KV			141-0018 ③			

① Use 12.6 VCT winding as two 6.3 VAC windings in parallel.
② Used in Model 24M only.
③ Halo-Light Trans.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T3	145Ω	625Ω	242-0001	A-8111	A-3000	TBO-1	Vertical Oscillator Trans.
T4	82Ω	1Ω	241-0006				Horizontal Output Trans.
	Tapped @ 30Ω	SEC. 2 10Ω					
		SEC. 3 0Ω					
		SEC. 4 0Ω					
T5	920Ω	8.5Ω	241-0004	A-8123	A-3037	TSO-5④	Vertical Output Trans.
T6A	20Ω		100-0007				Horizontal Deflection Coils
B	50Ω						Vertical Deflection Coils

④ Drill one new Mounting Hole

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T7	4.5KΩ	3.2Ω	500Ω	.7Ω	143-0020	A-3877	A-2930	RO-9④	④ Drill one New Mounting Hole.
					143-0017 ⑤				⑤ Used in Model 24M only.

SPEAKER

ITEM No.	RATINGS FIELD RES.	RATINGS V. C. IMP.	SYLVANIA PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1A	P.M.	3.2Ω	539-1002⑥	10J12	10A31	⑥ Used in Models 23B and 23M
B	P.M.	3.2Ω	539-0600⑦	6J4	6A1	⑦ Used in Models 22M-1
C	P.M.	3.2Ω	539-1203⑧	12J12	12A31	⑧ Used in Models 24M-1
	CONE DIA.	V. C. DIA.	539-1201⑨			⑨ Used in Models 24M (includes output Trans. and 4 prong plug)
SP2A	9 3/4"	1"				
B	5 7/8"	9/16"				
C	11¾"	1"				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~c)	SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.300A.	41Ω	1.2 Henries	145-0004	C-2326 ④	C-2326 ④	TR-330 ④	④ Drill one New Mounting Hole

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	SYLVANIA PART No.	IRC PART No.	NOTES
L2	Ant. Trans.	.1Ω	0Ω			
L3	Ant. Coil	0Ω				
L4	RF Coil	.1Ω				
L5	RF Coil Pri.	0Ω				
L6	RF Coil Sec.	0Ω				
L7	RF Coil Pri.	0Ω				
L8	RF Coil Sec.	0Ω				
L9	RF Coupling Coil	0Ω				
L10	Osc. Coil	0Ω				
L11	Osc. Coil	0Ω				
L12	Fil. Choke	0Ω				
L13	1st. Video IF	1.1Ω				
L14	Cath. Trap					Not used in all Models
L15	Fil. Choke	.1Ω		147-0014		
L16	2nd. Video IF	.8Ω	.8Ω	125-0002		
L17	Fil. Choke	.1Ω		147-0014		
L18	3rd. Video IF	.8Ω	.8Ω	125-0002		
L19	Sound Trap	.3Ω		118-0007		
L20	Fil. Choke	.1Ω		147-0014		
L21	4th. Video IF	.8Ω	.8Ω	125-0002		
L22	Adj. Sound Trap	.3Ω		118-0007		
L23	Cath. Trap	0Ω	0Ω	118-0005		
L24	5th. Video IF	.6Ω	1.2Ω	120-0002		
L25A	Peaking Coil	4.8Ω		131-2005		Both Peaking Coils Wound on Same Form.
B	Peaking Coil	1Ω				
L26A	Peaking Coil	5.1Ω		131-2003		Both Peaking Coils Wound on same Form
B	Peaking Coil	12Ω				
L27	1st. Sound IF	5.8Ω		130-0001		
L28	2nd. Sound IF	2.7Ω	2.7Ω	120-0001		
L29	Ratio Det. Primary	2.4Ω		128-0004		
L30	Ratio Det. Secondary	3Ω	1.6Ω	128-0005		
L31	Horiz. Osc. coil	72Ω	36Ω	128-0006		Secondary #3 - 9.5Ω
L32	Ringing Coil	35Ω		146-0005		
L33	Horiz. Lin.	6.8Ω		133-0001		Tap at 2.8Ω

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

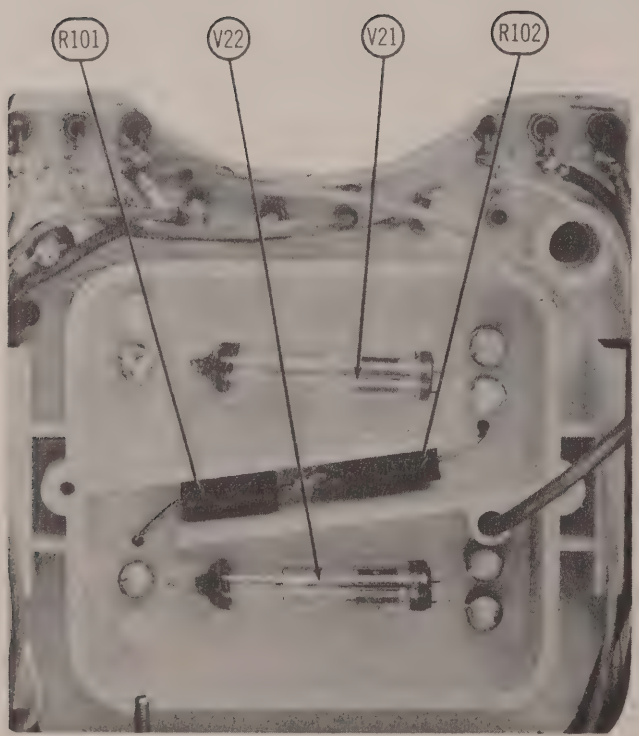
ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			SYLVANIA PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG	.250A	191-0005	487-0008	312.250	357001	

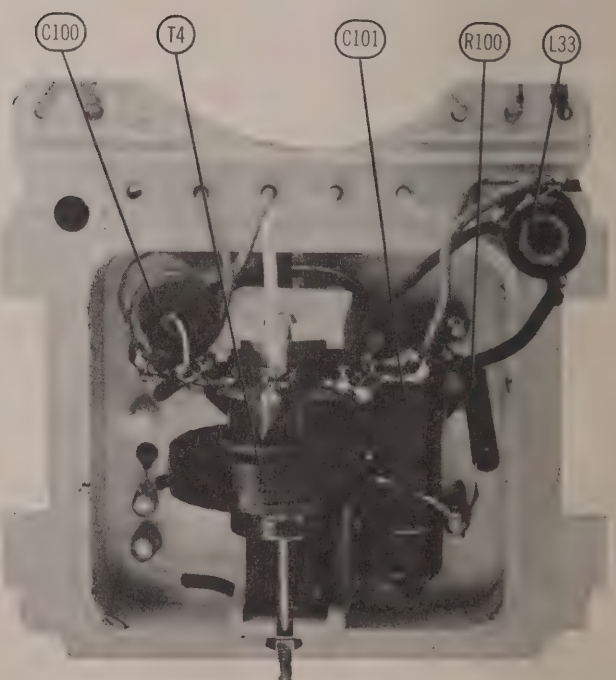
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					SYLVANIA PART No.		
M2	Bayonet	6.8	.15	Brown	611-0047		Type number 47

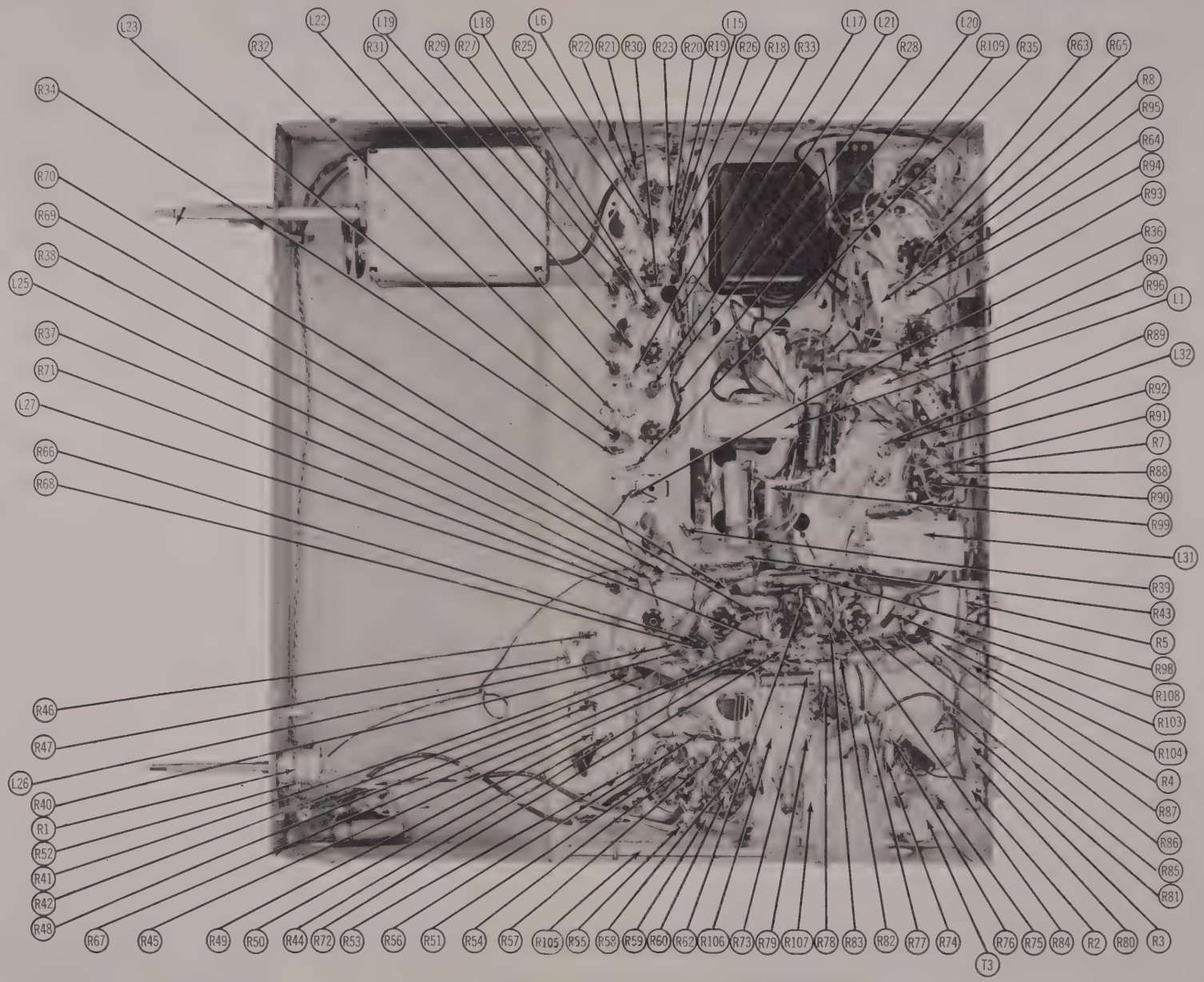
MISCELLANEOUS

ITEM No.	PART NAME	SYLVANIA PART No.	NOTES
M3A	RF Tuner	323-0009	Complete
M3B	RF Tuner	323-0004	Complete (Alternate)
M4	Switch	572-0001	Hi-Lo Band - Ant
M5	Switch	573-0005	Horizontal Size
M6	Switch	573-0006	Halo Light
M7	Switch	473-0002	Dial Light - (Model 24M)
M8	Halo Light	611-2000	
M9	Focus Magnet	400-0008	
M10	Ion Trap	400-0011	
	Knob	740-0024	Halo Light Selector
	Knob	744-0016	Brightness (Models 22M-1, 23B, 23M, 24M-1)
	Knob	744-0011	Brightness (Model 24M)
	Knob	743-0014	Fine Tuning (Models 22M-1, 23B, 23M, 24M-1)
	Knob	792-0004	Fine Tuning (Model 24M)
	Knob	743-0006	Channel Indicator (Model 24M)
	Knob	740-0020	Off/on Volume (Models 22M-1, 23B, 23M, 24M-1)
	Knob	740-0011	Off/on Volume (Model 24M)





HIGH VOLTAGE COMPARTMENT



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

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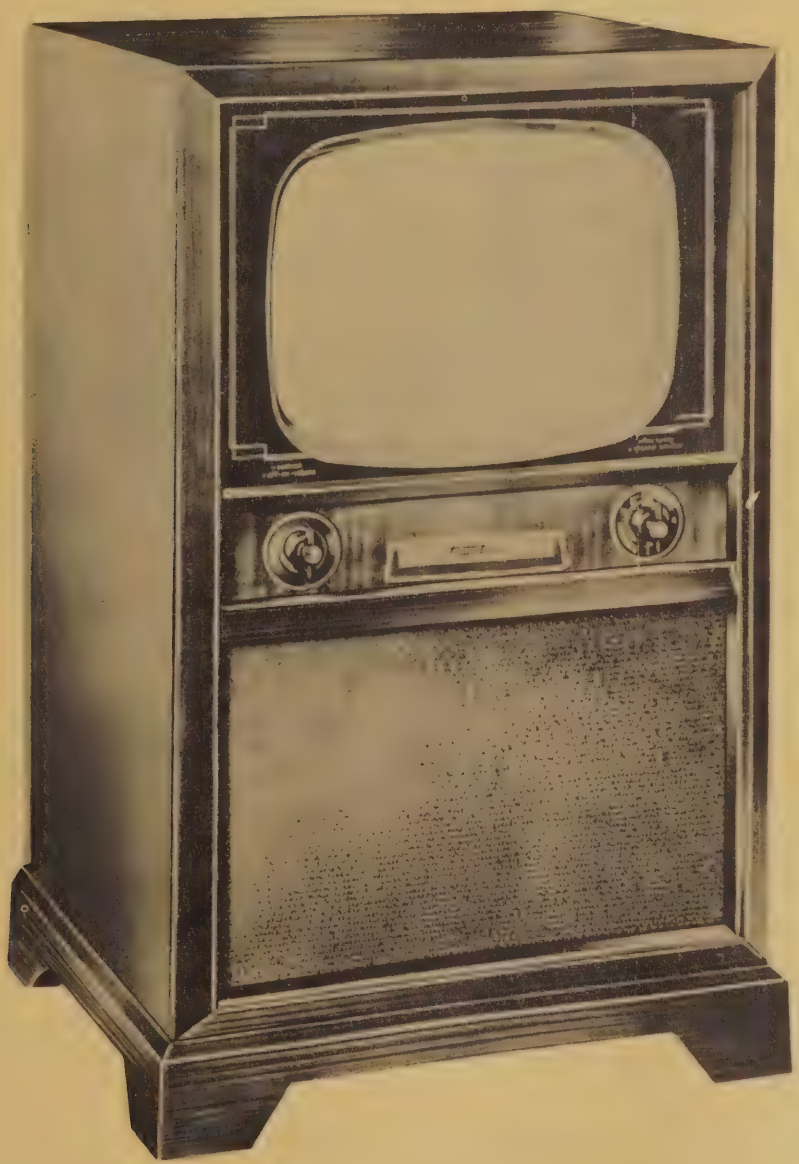
The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



TRUETONE
MODEL 2D1185B

HOWARD W. SAMS & CO., INC. • Indianapolis, Indiana

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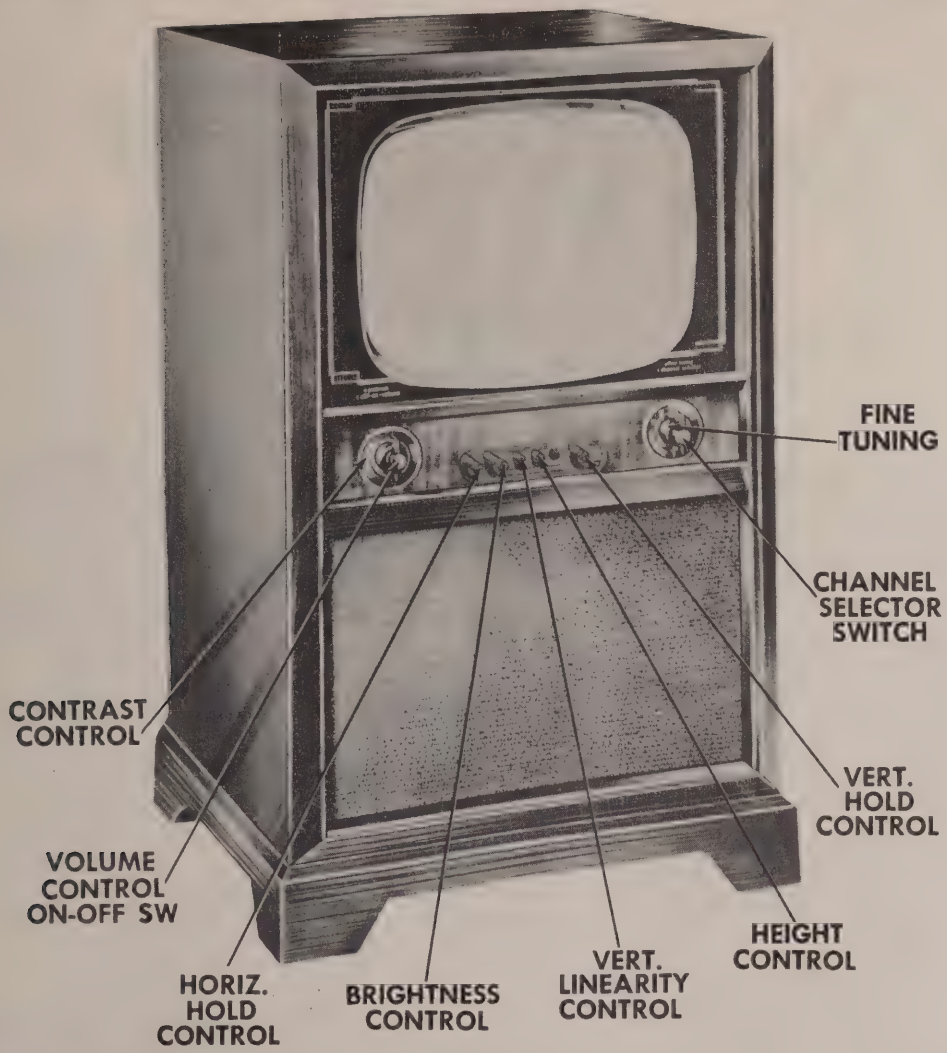
TRUETONE MODEL 2D1185B



TRUETONE MODEL 2D1185B

TRADE NAME	Truetone, Models 2D1185A, B
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Twenty-three

POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 2.1 Amp. at 117 Volts AC
TUNING RANGE– CHANNELS 2 thru 13

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 11
Horizontal Sweep Circuit Adjustments 11
Parts List and Description 12, 13, 14
Photographs
- Cabinet - Rear View 11
- Capacitor and Alignment Identification 4, 9
- Chassis - Top View 3
- RF Tuner 10
- Resistor and Inductor Identification 15, 16

Schematic 2
Tube Placement Charts 5
Voltage and Resistance Measurements 8

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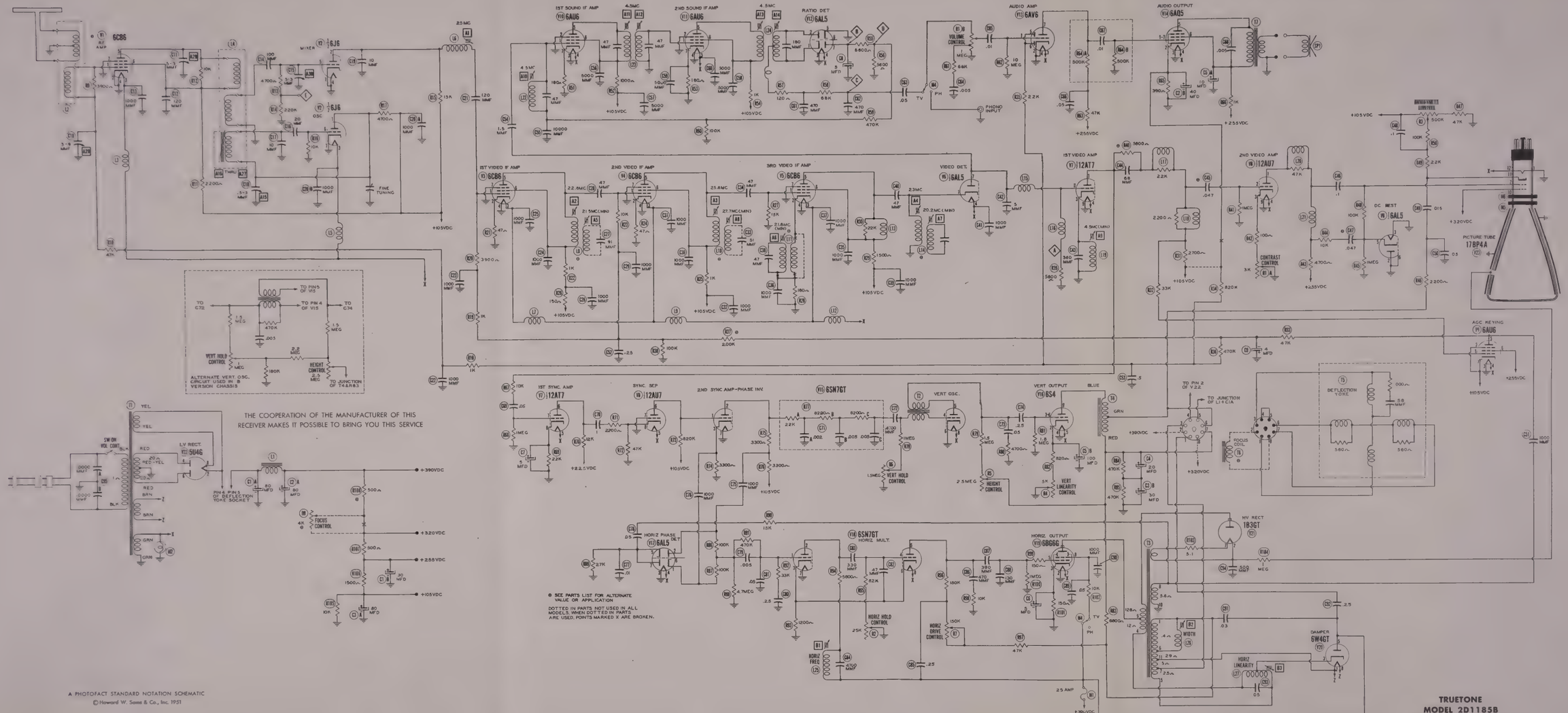
TRUETONE
MODEL 2D1185B
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
ALTERNATE VERT. OSC. CIRCUIT USED IN B VERSION CHASSIS
⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED, POINTS MARKED X ARE BROKEN.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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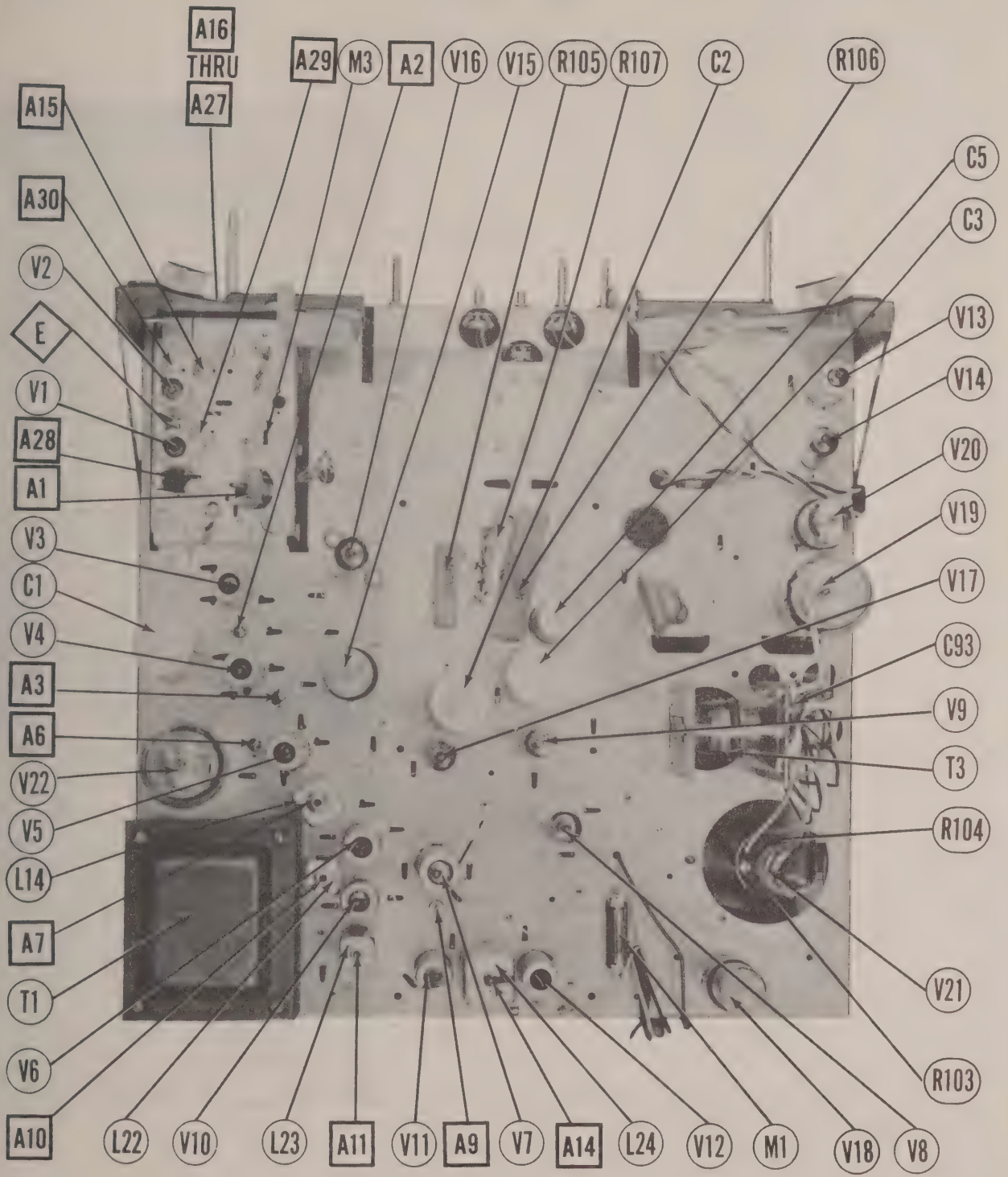
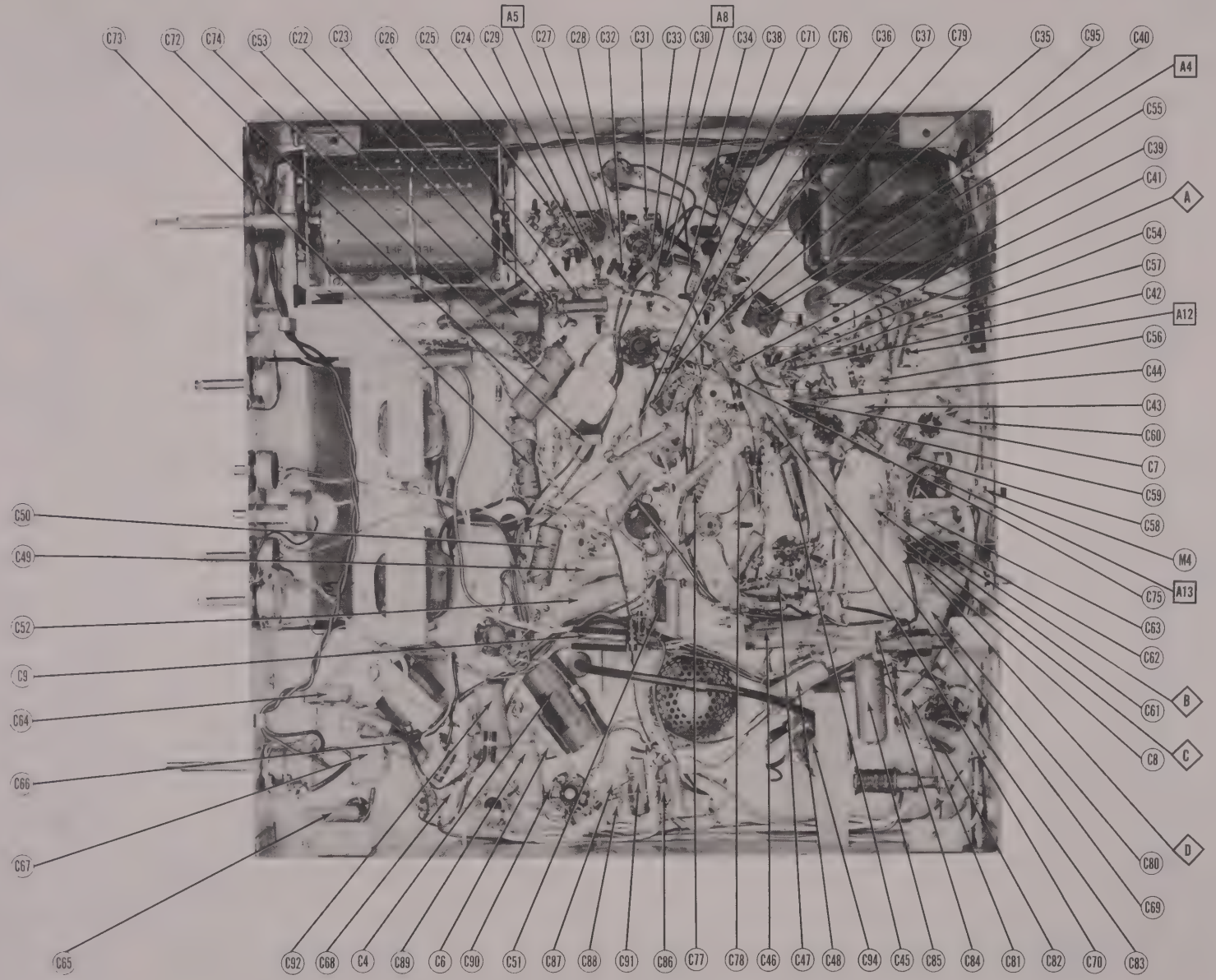
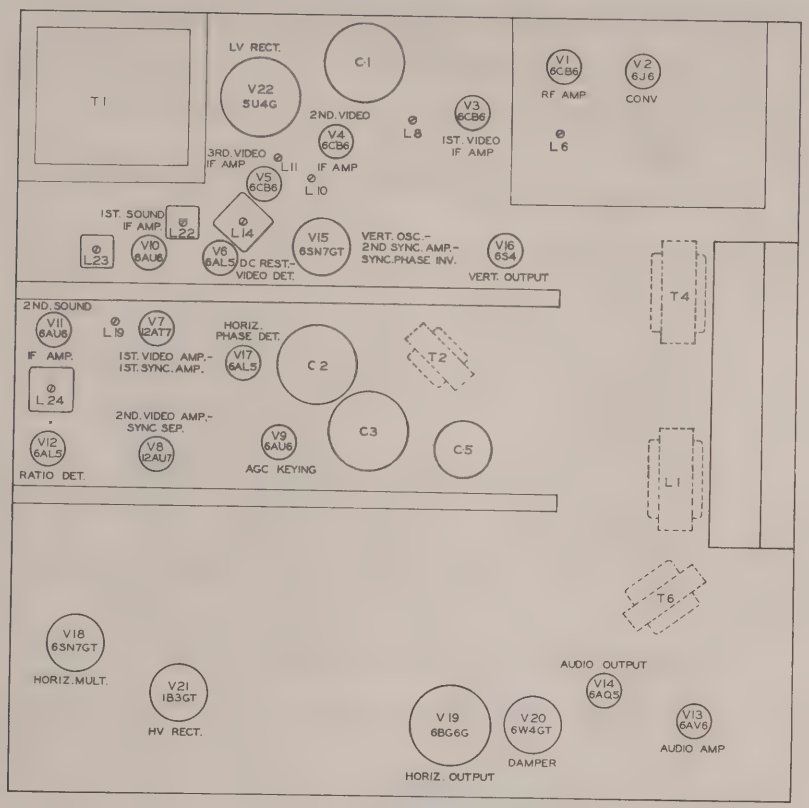
TRUETONE
MODEL 2D1185B



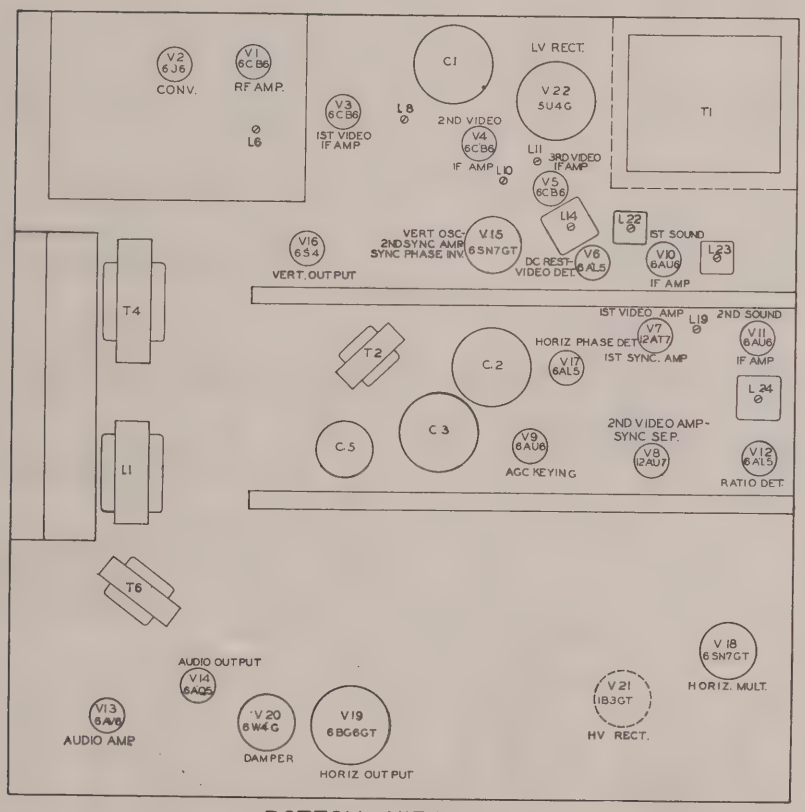
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW - CAPACITOR AND ALIGNMENT IDENTIFICATION



TOP VIEW



BOTTOM VIEW

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube, (V18), from its socket.

VIDEO IF ALIGNMENT (A VERSIONS ONLY)

Remove the converter tube, (V2), and replace it with a 6J6 which has pin 1 removed. This will disable the local oscillator and prevent the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to ungrounded lead of C52, connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	25MC (unmod.)	Any	DC probe to Point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	22.6MC	"	"	A2	"
3.	"	"	25.8MC	"	"	A3	"
4.	"	"	23MC	"	"	A4	"
5.	"	"	21.5MC	"	"	A5	Adjust for MINIMUM deflection.
6.	"	"	21.8MC	"	"	A6	"
7.	"	"	20.2MC	"	"	A7	"
8.	"	"	27.7MC	"	"	A8	"

VIDEO IF ALIGNMENT (B VERSIONS ONLY)

See instructions under A Version Video IF Alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis	25.1MC (unmod.)	Any	DC probe to Point (A). Common to chassis.	A1	Adjust for maximum deflection
2.	"	"	23.1MC	"	"	A2	"
3.	"	"	25.9MC	"	"	A3	" "
4.	"	"	24.1MC	"	"	A4	"
5.	"	"	21.7MC	"	"	A7	Adjust for MINIMUM deflection. Continue with step 9.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal side of the correct setting.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	"	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	24MC (10MC SWP)	21.7MC 22.4MC 22.6MC 25.25MC 26.2MC	Any	Vert. Amp. to Point (A). Low side to chassis.		Check for response curve similar to fig. 1A or 1B. If necessary retouch A1 thru A4 for proper response.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	10KΩ resistor	High side thru 10KΩ to pin 2, (Grid) of 12AT7, (V7). Low side to chassis.	Not used	4.5MC (400∿ Mod.)	Any	Vert. Amp. to pin 2, (Grid) of picture tube. Low side to chassis.	A9	Adjust for MINIMUM 400∿ indication on scope

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect a short across C55.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	10KΩ resistor	High side thru 10KΩ to pin 7, (plate) of 6AL5, (V6). Low side to chassis	4.5MC (unmod.)	Any	DC probe to Point (B). Common to chassis.	A10, A11, A12, A13,	Adjust for maximum deflection.
12.	"	"	"	"	DC probe to Point (C). Common to Point (D).	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	10KΩ resistor	High side thru 10KΩ to pin 7, (plate) of 6AL5, (V10). Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any	Vert. Amp. to Point (B). Low side to chassis.	A10, A11, A12, A13	Disconnect stabilizer capacitor C8. Adjust for maximum amplitude and symmetry as per fig. 2.
12.	"	"	"	"	"	Vert. Amp. to Point (C). Low side to chassis.	A14	Reconnect capacitor C8. Adjust A14 so 4.5MC occurs at center of crossover lines as per fig. 3. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

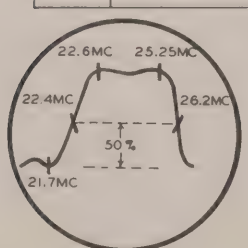


FIG. 1A

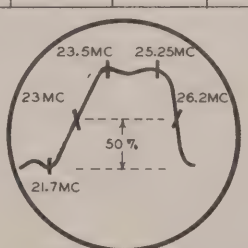


FIG. 1B

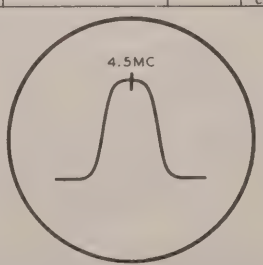


FIG. 2

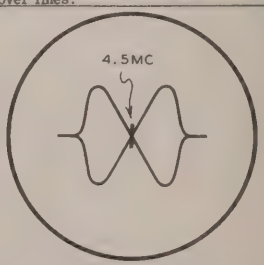


FIG. 3

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A15. It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel. If adjustment of A15 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel strip adjustments are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. Amp. to Point (A). Low side to chassis.	A16	Adjust to place sound marker in "notch" as per fig. 4. The video marker should be at 50%.
			207MC (10MC SWP)	205.25MC 209.75MC	12		A17	
			201MC (10MC SWP)	199.25MC 203.75MC	11		A18	
			195MC (10MC SWP)	193.25MC 197.75MC	10		A19	
			189MC (10MC SWP)	187.25MC 191.75MC	9		A20	
			183MC (10MC SWP)	181.25MC 185.75MC	8		A21	
			177MC (10MC SWP)	175.25MC 179.75MC	7		A22	
			85MC (10MC SWP)	83.25MC 87.75MC	6		A23	
			79MC (10MC SWP)	77.25MC 81.75MC	5		A24	
			69MC (10MC SWP)	67.25MC 71.75MC	4		A25	
			63MC (10MC SWP)	61.25MC 65.75MC	3		A26	
			57MC (10MC SWP)	55.25MC 59.75MC	2		A27	

RF AND MIXER ALIGNMENT

Leave the 3 volts bias connected as during video IF alignment.
Remove the AGC keying tube, (V9), from its socket.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC SWP)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to Point (E). Low side to chassis.	A28, A29, A30	Adjust for response curve similar to fig. 5 with markers above 90%.
15.	"	"	213MC (10MC SWP)	211.25MC 215.75MC	13	"		Check all channels for response similar to fig. 5. If markers fall below 70% on any channel, make slight adjustments of A28, A29 and A30 with channel switch set for that channel. Recheck all channels to see that they have not been seriously effected.
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			
			85MC (10MC SWP)	83.25MC 87.75MC	6			
			79MC (10MC SWP)	77.25MC 81.75MC	5			
			69MC (10MC SWP)	67.85MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 75.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

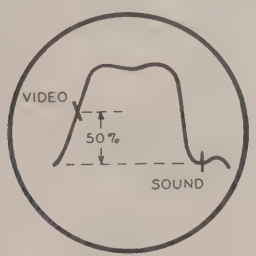


FIG. 4

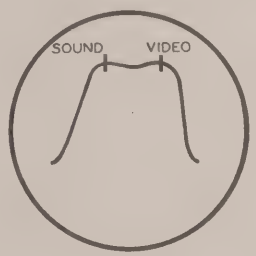


FIG. 5

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	-.8VDC	0V	6.3VAC	0V	80VDC	80VDC	0V		
V 2	6J6	80VDC	75VDC	6.3VAC	0V	-1.6VDC	§-5.7VDC	0V		
V 3	6CB6	-.3VDC	.6VDC	6.3VAC	0V	90VDC	90VDC	0V		
V 4	6CB6	-.3VDC	.6VDC	6.3VAC	0V	90VDC	90VDC	0V		
V 5	6CB6	0V	1.2VDC	6.3VAC	0V	95VDC	95VDC	0V		
V 6	6AL5	0V	0V	0V	6.3VAC	2.4VDC	0V	-1.7VDC		
V 7	12AT7	75VDC	-.5VDC	0V	6.3VAC	6.3VAC	250VDC	0V	8.7VDC	0V
V 8	12AU7	215VDC	0V	12VDC	6.3VAC	6.3VAC	16VDC	0V	1.9VDC	0V
V 9	6AU6	105VDC	110VDC	0V	6.3VAC	-.4VDC	255VDC	110VDC		
V 10	6AU6	0V	0V	0V	6.3VAC	110VDC	100VDC	.8VDC		
V 11	6AU6	0V	0V	6.3VAC	0V	100VDC	100VDC	1.1VDC		
V 12	6AL5	-.2VDC	-.2VDC	0V	6.3VAC	0V	0V	-.1VDC		
V 13	6AV6	-.5VDC	0V	6.3VAC	0V	-.9VDC	-.9VDC	80VDC		
V 14	6AQ5	0V	2.4VDC	0V	6.3VAC	205VDC	215VDC	0V		
V 15	6SN7GT	§17.5VDC	70VDC	18VDC	§-17VDC §-40VDC	100VDC 180VDC	0V	0V	6.3VAC	
V 16	6S4	0V	3.8VDC 7.4VDC	-.4VDC	0V	6.3VAC	-.4VDC	0V	0V	550VDC
V 17	6AL5	10.1VDC	-5.9VDC	0V	6.3VAC	0V	0V	0V		
V 18	6SN7GT	§2.9VDC	335VDC	15VDC	§-8.5VDC §-12VDC	200VDC 235VDC	15VDC	0V	6.3VAC	
V 19	6BG6G	0V	0V	14VDC	390VDC	-30VDC	-30VDC	6.3VAC	310VDC	Top Cap *
V 20	6W4GT	0V	560VDC	660VDC	0V	390VDC	660VDC	660VDC	660VDC	
V 21	1B3GT	* DO NOT MEASURE								Top Cap *
V 22	5U4G	0V	400VDC	0V	370VAC	0V	370VAC	0V	400VDC	
V 23	17BP4A	0V	1.6VDC	PIN 10 320VDC	PIN 11 10VDC 105VDC	PIN 12 6.3VAC				

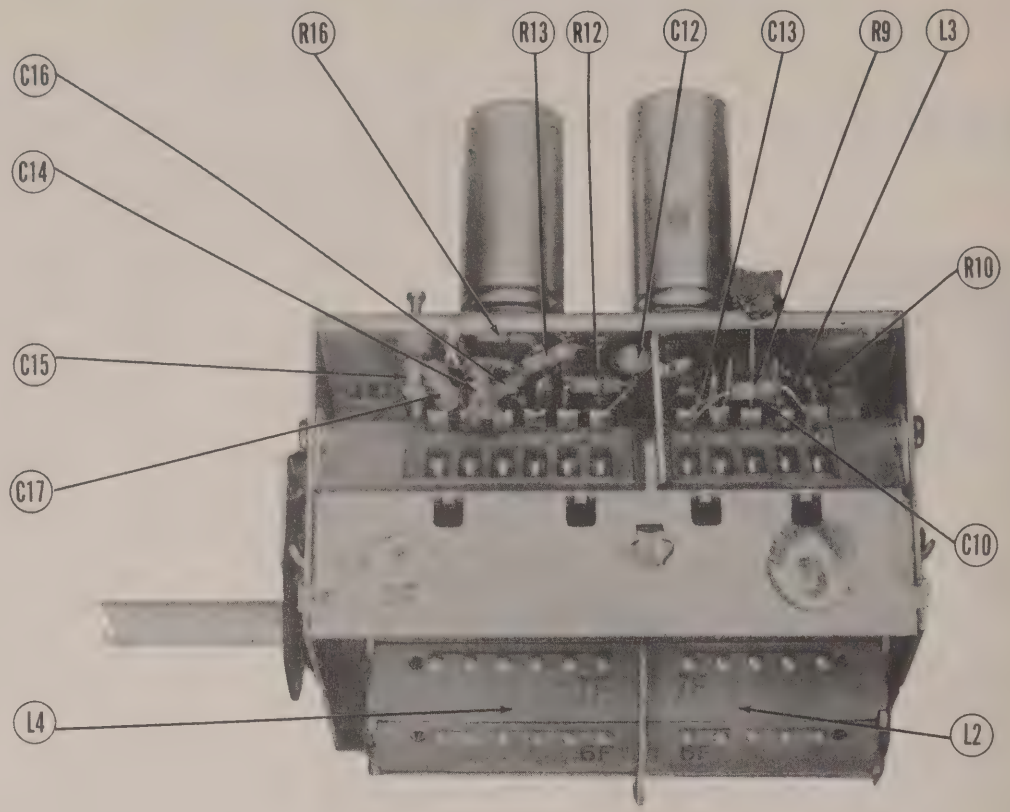
ALL MEASUREMENTS TAKEN WITH PICTURE TUBE REMOVED
* DO NOT MEASURE
§ TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

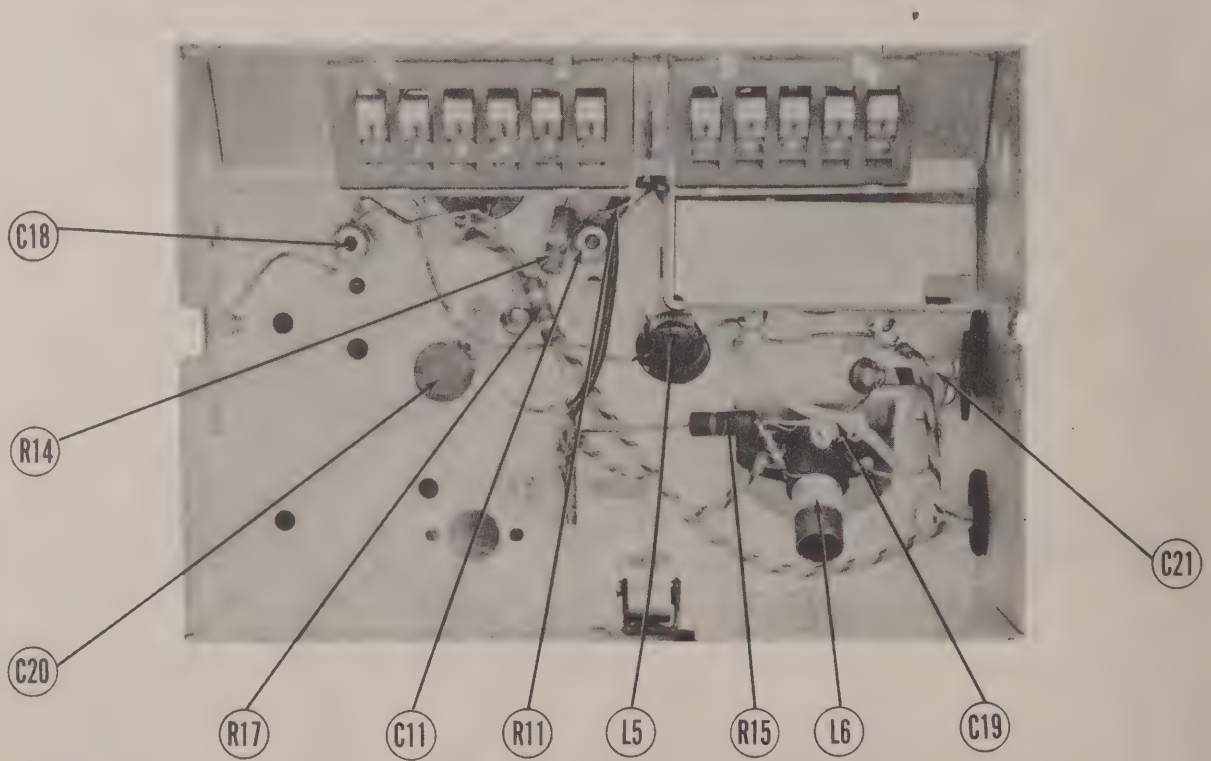
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	400KΩ	0Ω	.1Ω	0Ω	†4.7KΩ	†4.7KΩ	0Ω		
V 2	6J6	†7.1KΩ	†18KΩ	.1Ω	0Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	104KΩ	47Ω	.1Ω	0Ω	†3.5KΩ	†3.5KΩ	0Ω		
V 4	6CB6	110KΩ	47Ω	.1Ω	0Ω	†3.4KΩ	†3.4KΩ	0Ω		
V 5	6CB6	15KΩ	180Ω	.1Ω	0Ω	†4KΩ	†4KΩ	0Ω		
V 6	6AL5	.2Ω	0Ω	0Ω	.1Ω	1Meg	0Ω	5.6KΩ		
V 7	12AT7	†10.5KΩ	5.6KΩ	.2Ω	.1Ω	.1Ω	†13KΩ	1Meg	22KΩ	0Ω
V 8	12AU7	†5.5KΩ	1Meg	3.1KΩ	.1Ω	.1Ω	†800KΩ	0Ω	47KΩ	0Ω
V 9	6AU6	†35KΩ	†2.4KΩ	0Ω	.1Ω	130KΩ	†1KΩ	†2.4KΩ		
V 10	6AU6	100KΩ	0Ω	0Ω	.1Ω	†3.4KΩ	†3.4KΩ	100Ω		
V 11	6AU6	2.6Ω	0Ω	.1Ω	0Ω	†3.4KΩ	†3.4KΩ	180Ω		
V 12	6AL5	Inf.	Inf.	0Ω	.1Ω	0Ω	Inf.	11KΩ		
V 13	6AV6	10Meg	0Ω	.1Ω	0Ω	375KΩ	375KΩ	†548KΩ		
V 14	6AQ5	500KΩ	390Ω	0Ω	.1Ω	†2.4KΩ	†2KΩ	500KΩ		
V 15	6SN7GT	†800KΩ	†9KΩ	3.3KΩ	2.5Meg 1Meg	# 4Meg #1.5Meg	0Ω	0Ω	.1Ω	
V 16	6S4	Inf.	5.8KΩ 820Ω	1.8Meg	0Ω	.1Ω	1.8Meg	Inf.	Inf.	#7.8KΩ
V 17	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	27KΩ	Inf.	27KΩ		
V 18	6SN7GT	5.1Meg	†5.6KΩ	1.2KΩ	105KΩ 82KΩ	#370KΩ #225KΩ	1.2KΩ	0Ω	.1Ω	
V 19	6BG6G	Inf.	0Ω	150Ω	†50Ω	1Meg	1Meg	.1Ω	†10KΩ	Top Cap #15Ω
V 20	6W4GT	Inf.	700KΩ	700KΩ	Inf.	†50Ω	700KΩ	#9Ω	#9Ω	
V 21	1B3GT	PINS 1 THRU 8 HAVE INF. RESISTANCE								Top Cap #152Ω
V 22	5U4G	Inf.	13KΩ	Inf.	20Ω	Inf.	20Ω	Inf.	13KΩ	
V 23	17BP4A	0Ω	1.1Meg	PIN 10 †550Ω	PIN 11 †280KΩ †150KΩ	PIN 12 .1Ω				

ALL MEASUREMENTS TAKEN WITH PICTURE TUBE REMOVED
† MEASURED FROM PIN 2 OF V22
# MEASURED FROM PIN 3 OF V20

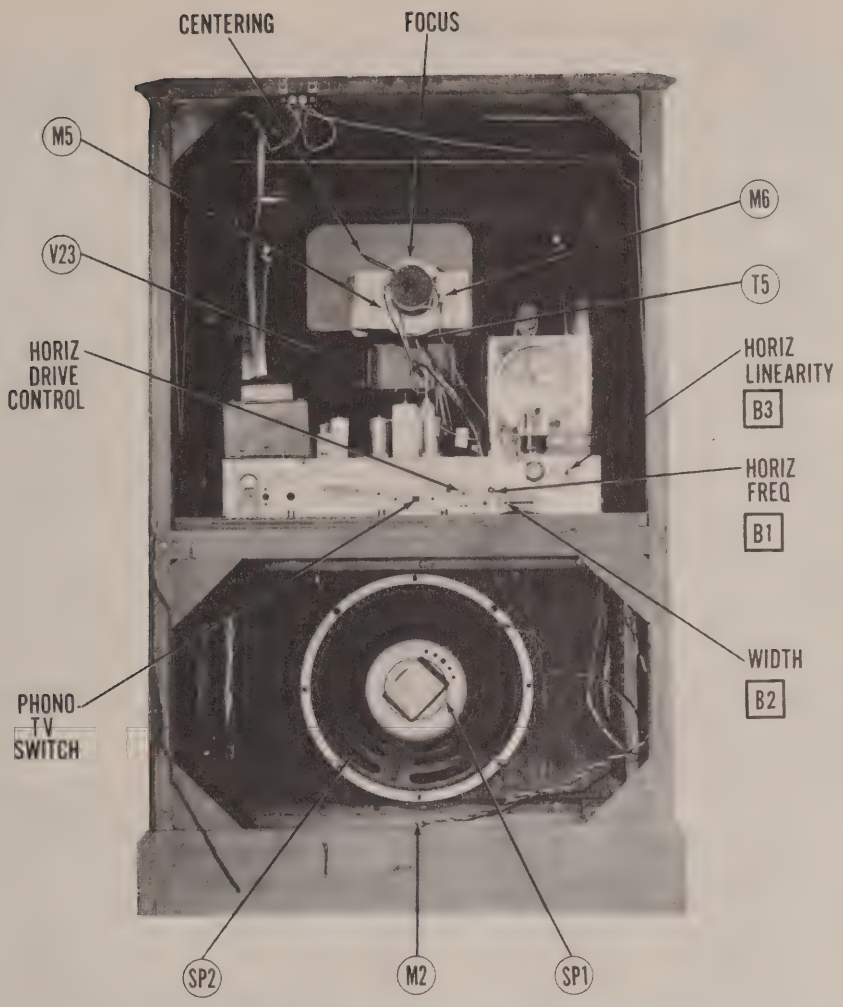
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal frequency slug, (B1), to the center of the range over which the picture synchronizes horizontally.

Turn the horizontal drive control clockwise until white, beaded, vertical lines appear in the left center portion of the picture. Then turn the control counter-clockwise just enough to remove the lines.

Adjust the width slug, (B2), until the picture is slightly wider than necessary to fill the mask horizontally.

Adjust the horizontal linearity slug, (B3), until the picture is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove two wood screws and two 1/4" hex head bolts from rear cover. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove antenna terminal strip.
5. Disconnect antenna terminal strip.
6. Remove jewel light from cabinet.
7. Remove five bolts securing chassis to cabinet. Remove chassis.
8. Remove four 11/32" hex nuts from speaker. Remove speaker.

NOTE: - FOR PICTURE TUBE REMOVAL, IT IS NECESSARY TO REMOVE THE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1A	RF Amplifier	6CB6	6CB6	6CK	
B	RF Amplifier	6AG5	6AG5	7BD	
V3	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	6CK	
V4	2nd. Video IF Amp.	6CB6	6CB6	6CK	
V5	3rd. Video IF Amp.	6CB6	6CB6	6CK	
V6	Video Detector - DC Restorer	6AL5	6AL5	6BT	
V7	1st. Video Amp. - 1st Sync Amp	12AT7	12AT7	9A	
V8	2nd. Video Amp. - Sync Separator	12AU7	12AU7	9A	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st Sound IF Amp	6AU6	6AU6	7BK	
V11	2nd Sound IF Amp	6AU6	6AU6	7BK	
V12	Ratio Detector	6AL5	6AL5	6BT	
V13	Audio Amplifier	6AV6	6AV6	7BT	
V14	Audio Output	6AQ5	6AQ5	7BZ	
V15	2nd Sync Amp. - Sync Phase Inv. - Vert. Oscillator	6SN7GT	6SN7GT	8BD	
V16	Vert. Output	6S4	6S4	8AC	
V17	Horiz. Phase Det	6AL5	6AL5	6BT	
V18	Horiz. Mult	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BG6G	6BG6G	5BT	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: TRUETONE PART No.	SYLVANIA PART No.	THOMAS PART No.	RMA BASE TYPE	NOTES
V23	17BP4A	17BP4A	17BP4	12D	Series "B" Uses 17CP4 Type Picture Tube

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	80	450	45X376	AFH3666J		UP8445		TVL-2777	▲ Filter
B	30	450							▲ Filter
C2A	80	450	45X384	AGH88J16B		UPT8045		TVL-2710	▲ Filter
B	40	50				V5			▲ Audio Output Cathode
C3A	80	450	45X376	AFH3666J		UP8445		TVL-2777	▲ Filter
B	30	450							▲ Vert. Output Dec.
C4	30	450	45X382	PRS450/30		BH2045A		TVA-1709	Vert. Output Decoupling
C5A	10	450	45X385	AFH4238B		UPT2150		TVL-1705	■ Audio Output Dec.
B	100	50				V10		TVA-1310	▲ Vert. Output Cathode
C6	5	25	45X378	PRS150/4		BR550		TVA-1203	Horiz. Output Cathode
C7	5	25	45X378	PRS150/4		BR550		TVA-1203	Sync. Amp. Cathode
C8	5	25	45X378	PRS150/4		BR550		TVA-1203	Stabilizing Cap.
C9	4	100	45X381	PRS150/4		BR415		TVA-1402	AGC Filter
C10	3-9		31B-207		829-10				Variable Trimmer
C11	.5-3		31B-206		829-3				Variable Trimmer
C12	120		13B-033		TCN-120		N750L-121		RF Amp. Decoupling
C13	1000		13D-041	SI1000	D6-102		GP2L-102	5HK-D1	RF Amp. Fil.
C14	100		13D-048	SI100N750	TCN-100		N750L-101	5TCC-T1	RF Coupling
C15	.5-3		31B-205		829-3				Variable Trimmer
C16	20		13D-042	SI20NP0	TCZ-20		NP0K-200		Osc. Grid Cap.
C17	10		13D-064	SI10NP0	TCZ-10		NP0K-100	5TCC-Q1	Fixed Trimmer
C18	.5-3		31B-206		829-3				Variable Trimmer
C19	10		13D-053	SI10NP0	TCZ-10		NP0K-100	5TCC-Q1	Fixed Trimmer
C20A	1000		13D-071	BPD-2X001	DD-2-102		812-001	5HK-2D1	RF Bypass
B	1000								Conv. Filament
C21	120		13B-033		TCN-120		N750L-121		IF Coupling
C22	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	AGC Filter
C23	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	AGC Filter
C24	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	1st. Video IF Decoupling
C25	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	1st. Video IF Filament
C26	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	RF Bypass
C27	91	500			TCZ-91		NP0-333-910		Fixed Trimmer
C28	47	500	47X565		1469-00005	TCZ-47	5R5Q5	NP0L-470	5TCC-Q47 IF Coupling
C29	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	AGC Filter
C30	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	2nd. Video IF Decoupling
C31	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	2nd. Video IF Filament
C32	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	RF Bypass
C33	51	500			1469-00005	TCZ-51	5R5Q5	NP0-333-510	Fixed Trimmer
C34	47	500	47X565		1469-00005	TCZ-47	5R5Q5	NP0L-470	5TCC-Q47 IF Coupling
C35	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	3rd. Video IF Dec.
C36	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	3rd. Video IF Cathode
C37	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	3rd. Video IF Filament
C38	47	500	47X565		1469-00005	TCZ-47	5R5Q5	NP0L-470	Fixed Trimmer
C39	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	RF Bypass
C40	47	500	47X565		1469-00005	TCZ-47	5R5Q5	NP0L-470	MS-45 IF Coupling
C41	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	Video Det. Filament
C42	5		47X562		TCZ-5		NP0K-050		Diode Load Cap.
C43	360	500	47X568		1469-00035	TCN-360		N750L-361	Fixed Trimmer
C44	68		47X599		SI68	D6-680	5R5Q7	GP1K-680	5GA-Q68 Video Coupling
C45	.047	400			P488-047	DF-503	PTE4S5	4TM-S47	Video Coupling †
C46	1	600	46X403		P688-1	DF-104	PTE6P1	6TM-P1	Video Coupling
C47	.047	400			P488-047	DF-503	PTE4S5	4TM-S47	Video Coupling †
C48	.1	200			P288-1	DF-104	PTE4P1	2TM-P1	Picture Tube Cathode
C49	.015	600	F65153		P688-015		PTE6S15	6TM-S15	Vert. Sweep Coupling
C50	.05	600	F65503		P688-05	DF-503	PTE6S5	6TM-S5	Integrator Net.
C51	1000	1000	47X569		1464-HV-001				Horiz. Sweep Coupling
C52	.25	200	B67254		P488-25		GT4P25	2TM-P25	AGC Filter
C53	.5	200	B65504		P288-5		GT2P5	2TM-P5	AGC Filter
C54	1.5		47X584		SII.5NP0	TCZ-1.5		NP0K-1R5	Sound IF Coupling
C55	10000		47X595		BPD-01	DD-103	1D3S1	821-01	5HK-S1 AVC Filter
C56	5000		47X507		BPD-005	DD-502	1D5D5	811-005	5HK-D5 1st. Sound IF Decoupling
C57	5000		47X507		BPD-005	DD-502	1D5D5	811-005	5HK-D5 RF Bypass
C58	5000		47X507		BPD-005	DD-502	1D5D5	811-005	5HK-D5 2nd. Sound IF Dec.
C59	5000		47X507		BPD-005	DD-502	1D5D5	811-005	5HK-D5 2nd. Sound IF Cathode

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C60	5000		47X507	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. Sound IF Filament
C61	470	500	47X525	1469-0005	D6-471	5R5T5	GP2K-471	MS-35	RF Bypass
C62	470	500	47X525	1469-0005	D6-471	5R5T5	GP2K-471	MS-35	De-emphasis
C63	.05	600	F65503	P688-05	DF-503	PTE6S5		6TM-S5	Audio Coupling
C64	.005	600	F65502	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Tone Compensation
C65	.01	200	B65103	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Audio Coupling
C66	.05	400	D65503	P488-05	DF-503	PTE4S5		4TM-S5	AZ Amp. Plate
C67	.01		†T6X5	P688-01	†PC-80	PTE6S1	GP2-333-103	6TM-S1	Audio Coupling
C68	.005	600	F65502	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Output Plate
C69	.05	400	D65503	P488-05	DF-503	PTE4S5		4TM-S5	Sync. Coupling
C70	.1	400	D65104	P488-1	DF-104	PTE4P1		4TM-P1	Sync. Coupling
C71(A)	.002			P688-002		PTE6D2	GP2-333-202		Vert. Integrator Net.
(B)	.005		♦T6X7	P688-005	♦PC-100	PTE6D5	GP2-333-502	♦101C1	Vert. Integrator Net.
(C)	.005			P688-005		PTE6D5	GP2-333-502		Vert. Integrator Net.
C72	4700	500	47X543	1464-005	D6-472	1DR5D5	GP2-333-472	MS-25	Vert. Osc. Grid
C73	.05	600	F65503	P688-05	DF-533	PTE6S5		6TM-S5	Vert. Discharge
C74	.25	400	D65254	P488-25		GT4P25		4TM-P25	Vert. Sweep Coupling
C75	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	Horiz. Sync. Coupling
C76	1000		47X519	SI1000	D6-102	1WSD1	GP2L-102	5HK-D1	Horiz. Sync. Coupling
C77	.01	400	B65103	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	AFC Filter
C78	.05	200	B65503	P288-05	DF-503	PTE4S5		2TM-S5	AFC Filter
C79	.005	600	F65502	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	AFC Filter
C80	.25	200	B65254	P488-25		GT2P25		2TM-P25	AFC Filter
C81	.05	200	B65503	P288-05	DF-503	PTE4S5		2TM-S5	Horiz. MV Grid
C82	47	500	47X565	1469-00005	TCZ-47	5R5Q5	NP0L-470	MS-45	Horiz. MV Grid
C83	330	500	47X570	1469-00035	TCN-330		N750L-331		Horiz. MV Feedback
C84	4700	500	47X543						Fixed Trimmer
C85	.25	400	D65254	P488-25		GT4P25		4TM-P25	Horiz. MV Decoupling
C86	470	500	47X525	1469-0005	TCN-470	5R5T5	N750L-471	MS-35	Horiz. Discharge
C87	390	500	47X571	1469-0004	TCN-390	5R5T4	N750L-391	MS-34	Horiz. Sweep Coupling
C88	130	500	RCM20A131K	1469-00015	TCN-130	5R5T15	N750L-131		Horiz. Output Grid
C89	.05	600	F65503	P688-05	DF-503	PTE6S5		6TM-S5	Horiz. Output Screen
C90	1000		47X519	SI1000	D6-102	1W5D1	GP2L-102	5HK-D1	Horiz. Output Screen
C91	.03	400	D65303	P488-03		PTE6S3		6TM-S3	Horiz. Sweep Coupling
C92	.25	400	D65254	P488-25		GT4P25		4TM-P25	Horiz. Sweep Coupling
C93	.06	400	D65503	P488-05	DF-503	PTE4S5		4TM-S5	Fixed Trimmer
C94	500	20000	47X560		HV20C	TV3-502			HV Filter
C95(A)	10000		76X8	BPD-01	DD-3-103	1D3S1	821-01	5HK-S1	Line Filter
(B)	10000			BPD-01		1D3S1	821-01	5HK-S1	Line Filter

† Items C67, R64A, R64B are combined in one unit.
♦ Items C71A, C71B, C71C, R77A, R77B, R77C are combined in one unit.
‡ Some models use .05MFD in this application (Mfgrs. Part # D65503)

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	3000Ω	½		Concentrikit			
B	1Meg	½	78X8	B17-114 ♯ø B13-137X ♯	RTV-218	SBBT-503-S	Contrast Control - Front Volume Control - Tapped ② 200KΩ - Rear
C	Shaft end			E-202 ♯			Attach per instructions in Concentrikit
D	Switch			76-1 ♯			
R2A	25KΩ	½	40X330	Q11-120	AG-40-S	B-26	Horiz. Hold Control
B	Shaft		Not req.	Not req.	KS8-3	Not req.	Attach to R2A per instructions
R3A	500KΩ	½	40X290	Q11-133	AG-56-S	B-59	Brightness Control
B	Shaft		Not req.	Not req.	KS8-3	Not req.	Attach to R3A per instructions
R4A	5000Ω	½	40X294	Q11-114	AM-19-S		Vert. Linearity Control
B	Shaft		Not req.	PQ ♯	RS-2 ♯		Attach to R4A per instructions
C	Bushing		Not req.	S-3 ♯	59-186 ♯		Attach to R4A per instructions
R5A	2.5Meg	½	40X293	Q11-239	AG-84-S	AN-83	Height Control
B	Shaft		Not req.	RQ	FKS-1/4	AK-1	Attach to R5A per instructions
R6A	1.5Meg	½	40X291	Q11-138	AG-83-S	AN-75	Vert. Hold Control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-4	Attach to R6A per instructions
R7	150KΩ	½	40X331		AG-52-S	B-44	Horiz. Drive Control
B	Shaft		Not req.		FKS-1/4	Not req.	Attach to R7A per instructions
R8	4000Ω	2	40X304				Focus Control - Wire Wound - See Note 1

Some models may use a 1 Meg tone control, connected from the high side of the Vol. Cont. thru .005 Mfd capacitor to chassis.
Cut bushing to correct length and fashion shaft to duplicate original.
‡ When using this replacement, connect a BTS-8200 resistor across the two terminals that are used.
ø Additional parts to be used with "Concentrikit".

RESISTORS

Note 1: Not used in all models.

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE SPECIFIED
R9	3900Ω	½	12A-046	BTS-3900	Antenna Coil Shunt
R10	47KΩ	20% ½	12A-039	BTS-47K	AGC Network
R11	2200Ω	20% ½	12A-049	BTS-2200	RF Amp. Decoupling
R12	10KΩ	20% ½	12A-040	BTS-10K	RF Coil Shunt
R13	4700Ω	20% ½	12A-042	BTS-4700	Mixer Grid
R14	220KΩ	20% ½	12A-041	BTS-220K	Mixer Grid
R15	15KΩ	20% ½	12A-021		Mixer Plate
R16	10KΩ	1	12A-040	BTS-10K	Osc. Grid
R17	4700Ω	1	12A-042	BTS-4700	Osc. Plate
R18	1000Ω	1	B85102	BTS-1000	AGC Network
R19	1000Ω	1	B85102	BTS-1000	AGC Network
R20	3900Ω	5% 1	B83392	BTS-3900-5%	1st. Video IF Amp. Grid
R21	47Ω	5% 1	B83470		1st. Video IF Amp. Cathode
R22	1000Ω	1	B85102	BTS-1000	1st. Video IF Amp. Decoupling
R23	10KΩ	5% 1	B83103		2nd. Video IF Amp. Grid
R24	47Ω	5% 1	B83470		2nd. Video IF Amp. Cathode
R25	1000Ω	1	B84102	BTS-1000	2nd. Video IF Amp. Decoupling
R26	150Ω	1	B84181	BTS-150	Decoupling
R27	15KΩ	20% ½	B83153	BTS-15K	3rd. Video IF Amp. Grid
R28	180Ω	1	B84181	BTS-180	3rd. Video IF Amp. Cathode
R29	1500Ω	1	B85152	BTS-1500	3rd. Video IF Amp. Decoupling
R30	22KΩ	½	B84223	BTS-22K	Plate Choke Shunt
R31	2700Ω	5% 1	C83272	BTA-2700-5%	Voltage Divider
R32	33KΩ	1	B84333	BTS-33K	AGC Keying Grid
R33	47KΩ	1	B84473	BTS-47K	AGC Network
R34	820KΩ	½	B84824	BTS-820K	Voltage Divider
R35	22KΩ	1	B84223	BTS-22K	Diode Load
R36	47KΩ	1	B84473	BTS-47K	AGC Network
R37	200KΩ	5% 1			AGC Network - See Note 3
R38	100KΩ	1	B85104	BTS-100K	AGC Network
R39	5600Ω	1	B84562	BTS-5600	Video Det. Diode Load
R40	5600Ω	1	B84562	BTS-5600	1st. Video Amp. Plate - See Note 4

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	IDENTIFICATION CODES
R41	1Meg	20% ½	B85105	BTS-1Meg	2nd. Video Amp. Grid
R42	100Ω	1	B84101	BTS-100	2nd. Video Amp. Cathode
R43	4700Ω	5% 1	C83472	BTA-4700	2nd. Video Amp. Plate
R44	10KΩ	5% ½	B83103	BTS-10K-5%	Isolation
R45	1Meg	20% ½	B85105	BTS-1Meg	DC Restorer Diode Load
R46	2200Ω	20% ½	B85222	BTS-2200	Vert. Retrace Blanking Network
R47	47KΩ	½	B84473	BTS-47K	Voltage Divider
R48	100KΩ	½	B85104	BTS-100K	Picture Tube Grid
R49	22KΩ	½	B84223	BTS-22K	Picture Tube Cathode
R50	100KΩ	½	B84104	BTS-100K	Picture Tube Cathode
R51	100Ω	½	B84101	BTS-100	1st. Sound IF Amp. Cathode
R52	1000Ω	½	B84102	BTS-1000	1st. Sound IF Amp. Decoupling
R53	180Ω	½	B84181	BTS-180	2nd. Sound IF Amp. Cathode
R54	1000Ω	½	B84105	BTS-1000	2nd. Sound IF Amp. Decoupling
R55	5600Ω	½	B84562	BTS-5600	Ratio Det. Diode Load
R56	5600Ω	½	B84562	BTS-5600	Ratio Det. Diode Load
R57	120Ω	½	B84121	BTS-120	Balancing
R58	68KΩ	½	B84683	BTS-68K	De-emphasis
R59	470KΩ	½	B84474	BTS-470K	AGC Network
R60	100KΩ	½	B84104	BTS-100K	AVC Network
R61	68KΩ	½	B84683	BTS-68K	Tone Compensation
R62	10Meg	20% ½	B85106	BTS-10Meg	AF Amp. Grid
R63	47KΩ	½	B84473	BTS-47K	AF Amp. Plate Decoupling
R64A	500KΩ	½	76X5 †	BTS-470K	AF Amp. Plate
B	500KΩ	½		BTS-470K	Output Grid
R65	390Ω	1	C84391	BTA-390	Output Cathode
R66	1000Ω	2	D84102	BTB-1000	Output Decoupling
R67	10KΩ	½	B84103	BTS-10K	Isolation
R68	1Meg	20% ½	B85105	BTS-1Meg	Sync. Amp. Grid
R69	22KΩ	½	B84223	BTS-22K	Sync. Amp. Cathode
R70	12KΩ	½	B84123	BTS-12K	Sync. Amp. Plate
R71	2200Ω	½	B84222	BTS-2200	Isolation
R72	47KΩ	½	B84473	BTS-47K	Sync. Sep. Cathode
R73	820KΩ	½	B84824	BTS-820K	Sync. Sep. Plate
R74	3300Ω	5% ½	B83332	BTS-3300-5%	Sync. Phase Inv. Cathode
R75	3300Ω	5% ½	B83332	BTS-3300-5%	Sync. Phase Inv. Plate
R76	3300Ω	5% ½	B83332	BTS-3300-5%	Sync. Phase Inv. Plate
R77A	22KΩ	½	76X7 ♦	BTS-22K	Integrator
B	8200Ω	½		BTS-8200	Integrator
C	8200Ω	½		BTS-8200	Integrator
R78	1Meg	½	B84105	BTS-1Meg	Vert. Osc. Grid
R79	1.5Meg	½	B84155	BTS-1.5Meg	Vert. Osc. Plate
R80	4700Ω	5% ½	B83472	BTS-4700-5%	Vert. Peaking
R81	1.5Meg	½	B84185	BTS-1.5Meg	Vert. Output Grid
R82	820Ω	½	B84821	BTS-820	Vert. Output Cathode
R83	6800Ω	2	D84682	BTB-6800	Decoupling
R84	470KΩ	½	B84474	BTS-470K	Bleeder
R85	470KΩ	½	B84474	BTS-470K	Bleeder
R86	100KΩ	½	B84104	BTS-100K	Horiz. Phase Det. Diode Load
R87	100KΩ	½	B84104	BTS-100K	Horiz. Phase Det. Diode Load
R88	4.7Meg	20% ½	B85475	BTS-4.7Meg	Horiz. Phase Det. Diode Load
R89	27KΩ	½	B84273	BTS-27K	Horiz. Phase Det. Diode Load
R90	15KΩ	1	C84153	BTA-15K	Horiz. Feedback
R91	470KΩ	½	B84474	BTS-470K	Horiz. AFC Filter
R92	33KΩ	½	B84333	BTS-33K	Horiz. AFC Filter
R93	1200Ω	½	B84122	BTS-1200	Horiz. MV Cathode
R94	5600Ω	½	B84562	BTS-5600	Horiz. MV Plate
R95	82KΩ	½	B84823	BTS-82K	Horiz. MV Grid
R96	180KΩ	½	B84184	BTS-180K	Horiz. MV Plate
R97	47KΩ	20% ½	B84473	BTS-47K	Horiz. MV Decoupling
R98	10KΩ	½	B84103	BTS-10K	Horiz. Peaking
R99	150Ω		B84151		Parasitic Suppressor
R100	1Meg	1	B84105	BTS-1Meg	Horiz. Output Grid
R101	150Ω	5	43X263	1 3/4A-150	Horiz. Output Cathode - Wire Wound
R102	10KΩ	5	43X247	1 3/4A-10K	Horiz. Output Screen - Wire Wound
R103	5.1Ω	½	A93X239	BW-½-5.1	HV Rectifier Filament
R104	1Meg	20% 1	C85105		HV Filter
R105	10KΩ	5	43X247	1 3/4A-10K	Bleeder - Wire Wound
R106	150Ω	15	43X261	2D-150	Voltage Divider - Wire Wound
R107	500Ω	10	43X245	1 3/4A-500	Voltage Divider - Wire Wound
R108	500Ω	5	43X257	1 3/4A-500	Focus Coil Shunt - Wire Wound - See Note 5

† Items R64A, R64B, and C67 are combined into one unit.
♦ Items R77A, R77B, R77C, C71A, C71B, and C71C are combined into one unit.
Note 2 Not used in all models.
Note 3 Some models use 220KΩ resistor in this application.
Note 4 Some models use Parallel resistors in this application to obtain desired value.
Note 5 In models not employing a Focus Coil, R108 becomes a Filter Resistor.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	750VCT .250ADC	5VAC ② 3A	6.3VAC ② 8A	53X318		P-3059	TP-360

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	200Ω	1.15KΩ	54X7	A-8122 ①	A-3000 ①	TB0-2 ①	Vert. Block Osc. Trans.
T3	140Ω Tap 12Ω	10.8Ω Taps 2.5Ω and 10.4Ω SEC. 2 5.6Ω SEC. 3 0Ω	53X320		BV0-7 and MWC-1		Horiz. Output Trans.
T4	1KΩ Tap 12Ω		51X151	A-8112	A-3037 ①	TS0-5 ①	Vert. Output Trans.
T5A	20Ω		9A2193	DY-9	MDF-70		Horiz. Deflection Coil.
B	50Ω						Vert. Deflection Coil.
T6	66.5Ω		9A2220 ②				Focus Coil ②

① Drill one new mounting hole.
② Not used in all models.

TRUETONE MODEL 2D1185B

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T7	5.5KΩ	3.2Ω	465Ω	.2Ω	51X150	A-3823 ①	A-2930	RO-9 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	TRUETONE PART No.	VIKING PART No.	QUAM PART No.	
SP1	PM	3.2Ω	12A505	8J9	8A21	
	CONE DIA.	V. C. DIA.				
SP2	7 3/4"	9/16"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ↙)	TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.250	52Ω	2 Henries	52X88	C-2326	C-2991	TR-3300①①	Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	
L2	Ant. Coil	0Ω	0Ω	9A2119		Channel # 2 } Part of Tuner Unit
L3	Fil. Choke	0Ω				
L4	RF, Mixer Grid and Osc.	0Ω		9A2131		Channel # 2 } Part of Tuner Unit
L5	Fil. Choke	0Ω				
L6	1st. Video IF	.8Ω		31A095		
L7	Fil. Choke	0Ω		9A2033		
L8	2nd. Video IF	.3Ω		9A2165		Includes Trap - Used in "A" Versions Only
L8	2nd. Video IF			9A2225		"B" Versions Only - No Trap
L9	Fil. Choke	0Ω		9A2033		
L10	3rd. Video IF	.2Ω		9A2166		Includes Trap - Used in "A" Versions Only
L10	3rd. Video IF			9A2225		Used in "B" Versions Only - No Trap
L11	Sound Trap	0Ω	.2Ω	9A2169		Not used in "B" Versions
L12	Fil. Choke	0Ω		9A2033		
L13	RF Choke	2.6Ω		9A1979		
L14	4th. Video IF	.1Ω		9A2167		Used in "A" Versions Only
L14	4th. Video IF			9A2226		Used in "B" Version Only
L15	Peaking	8Ω		36A1	19-1920	100 Microhenries (Yellow Dot)
L16	Peaking	30Ω		36A5		750 Microhenries (Green Dot)
L17	Peaking	15Ω		36A7	19-1921	190 Microhenries (Orange Dot)
L18	Peaking	16Ω		36A4	19-1922	125 Microhenries (Red Dot)
L19	4.5MC Trap	.2Ω		9A2074		
L20	Peaking	15Ω		36A8	19-1921 †	185 Microhenries Wound on 47KΩ resistor (Brown Dot)
L21	Peaking	15Ω		36A2	19-1921	190 Microhenries (White Dot)
L22	1st. Sound IF	2.8Ω		9A2168		
L23	2nd. Sound IF	2.5Ω	2.6Ω	9A2170		
L24	Ratio Det. Trans.	2.8Ω	.3Ω	9A2171		Tap. 7Ω
L25	Horiz. Osc.	50Ω		9A2096		
L26	Width Coil	.6Ω		9A2183		
L27	Horiz. Lin.	3.8Ω	Tap 5.1Ω	9A2172		

† Parallel with 47KΩ resistor.

FUSES

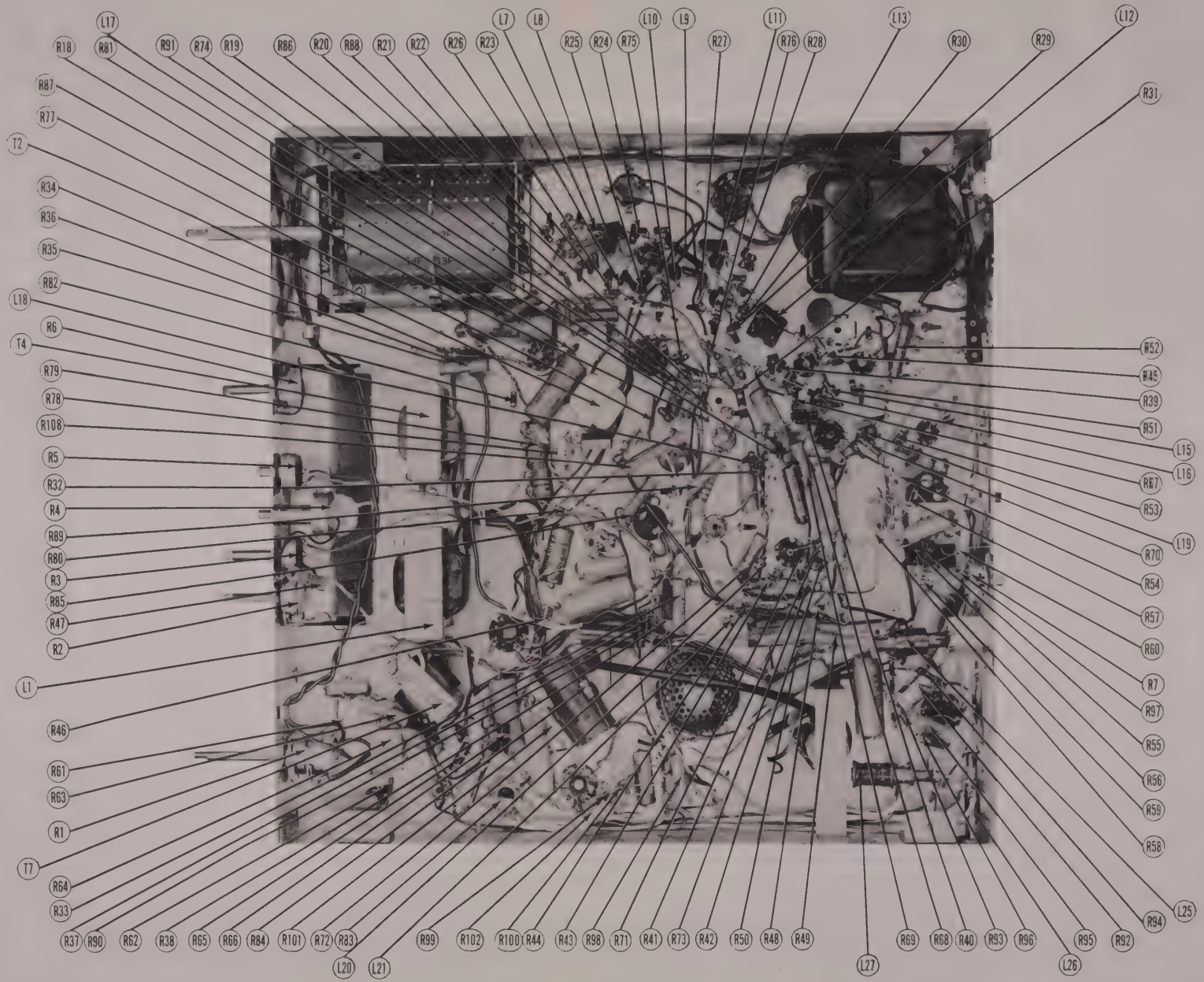
ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			TRUETONE PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG Slo Blo.	.250	16X147	16X146	313.250	357001	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					TRUETONE PART No.		
M2	Bayonet	7.5	.2	White	7A32		Type # 51

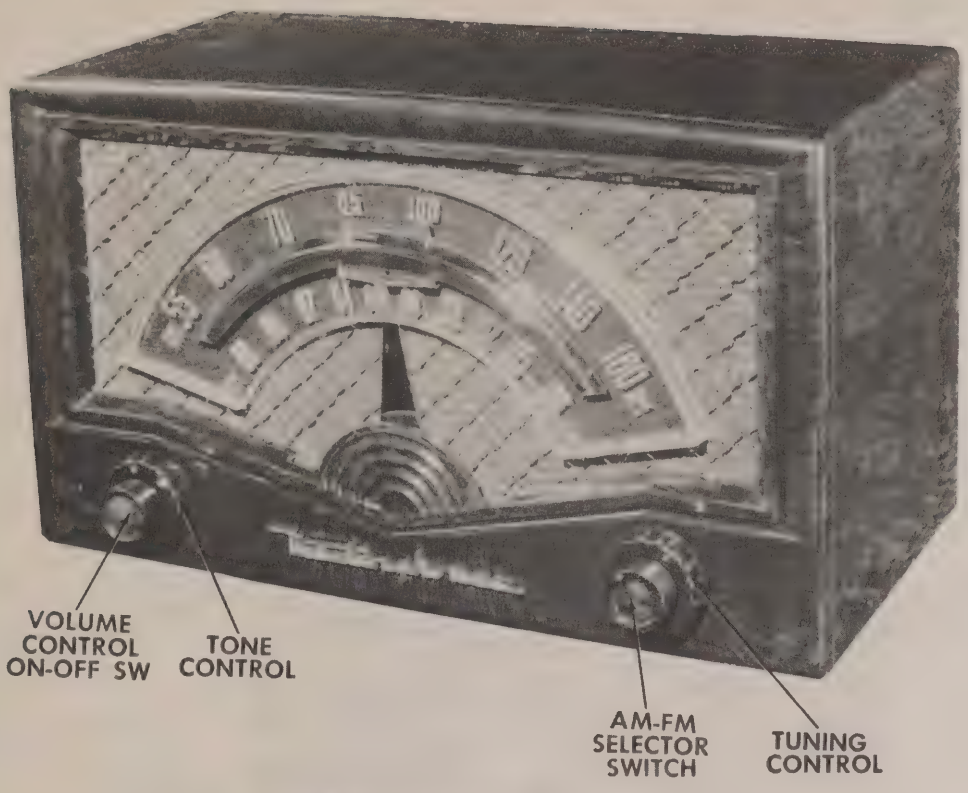
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	RF Tuner	25A1080	
M4	Switch	2A402	TV-Phono
M5	Focus Magnet	2A410	Not used in all models.
M6	Ion Trap	2A407	
	Ant. Coil	9A2120	Channel # 3
	Ant. Coil	9A2121	Channel # 4
	Ant. Coil	9A2122	Channel # 5
	Ant. Coil	9A2123	Channel # 6
	Ant. Coil	9A2124	Channel # 7
	Ant. Coil	9A2125	Channel # 8
	Ant. Coil	9A2126	Channel # 9
	Ant. Coil	9A2127	Channel # 10
	Ant. Coil	9A2128	Channel # 11
	Ant. Coil	9A2129	Channel # 12
	Ant. Coil	9A2130	Channel # 13
	RF, Mixer and Osc.	9A2132	Channel # 3
	RF, Mixer and Osc.	9A2133	Channel # 4
	RF, Mixer and Osc.	9A2134	Channel # 5
	RF, Mixer and Osc.	9A2135	Channel # 6
	RF, Mixer and Osc.	9A2136	Channel # 7
	RF, Mixer and Osc.	9A2137	Channel # 8
	RF, Mixer and Osc.	9A2138	Channel # 9
	RF, Mixer and Osc.	9A2139	Channel # 10
	RF, Mixer and Osc.	9A2140	Channel # 11
	RF, Mixer and Osc.	9A2141	Channel # 12
	RF, Mixer and Osc.	9A2142	Channel # 13



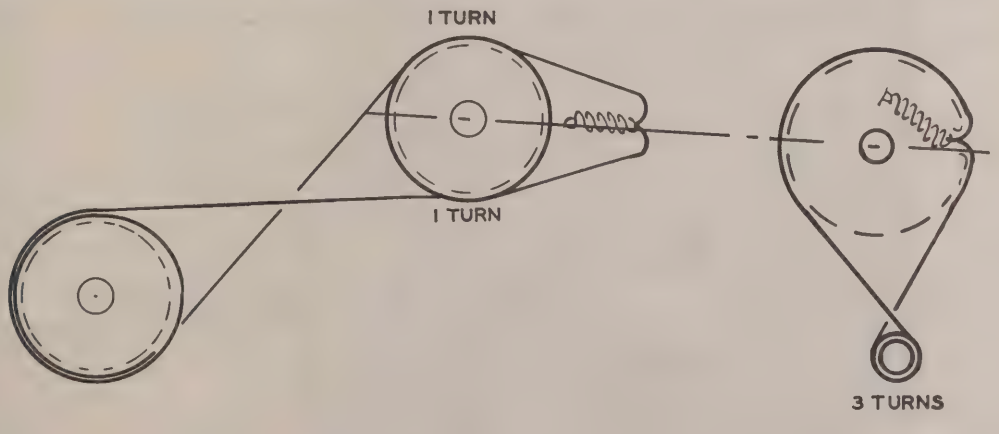
CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

WESTINGHOUSE MODELS
H350T7, H351T7 (Ch. V-2180-1)



WESTINGHOUSE MODEL H350T7

TRADE NAME	Westinghouse Models H350T7, H351T7 (Ch.V-2180-1) Westinghouse
MANUFACTURER	Westinghouse Elect. Corp., Home Receiver Div., Sunbury, Pa.
TYPE SET	AD-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types 6BJ6 FM RF Amp., 12AT7 FM-AM Conv., 12BA6 lst FM-AM IF Amp., 12BA6 2nd FM IF Amp., 12AL5 Ratio Det., 12AV6 AM Det.-AVC-AF Amp., 50C5 Power Output.
POWER SUPPLY	110-120 Volts AC-DC RATING .36 Amp. @117 Volts AC
TUNING RANGE-BROADCAST 540-1615KC	FREQ: MOD: 88 - 108MC



DIAL CORD DRIVE

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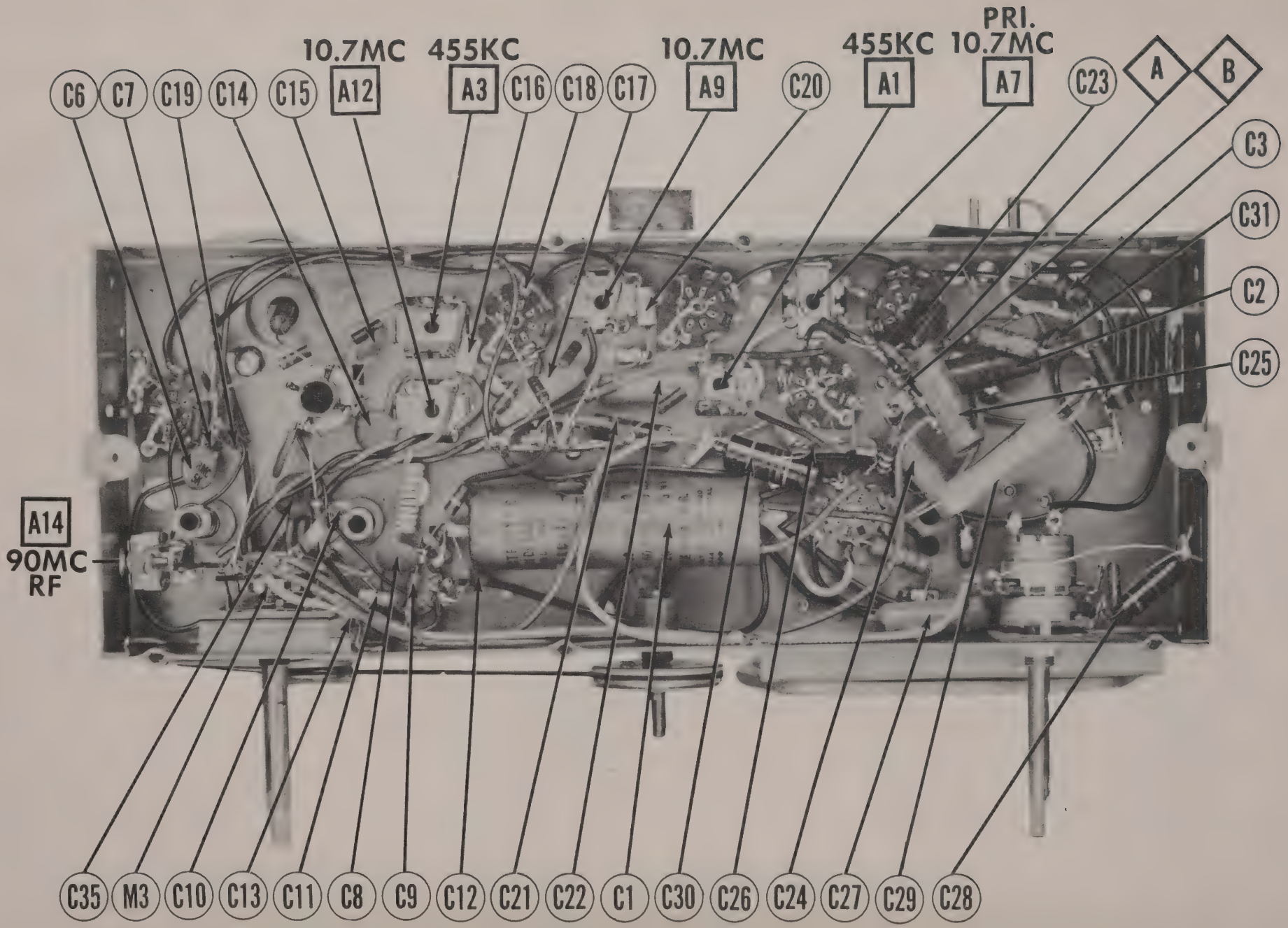
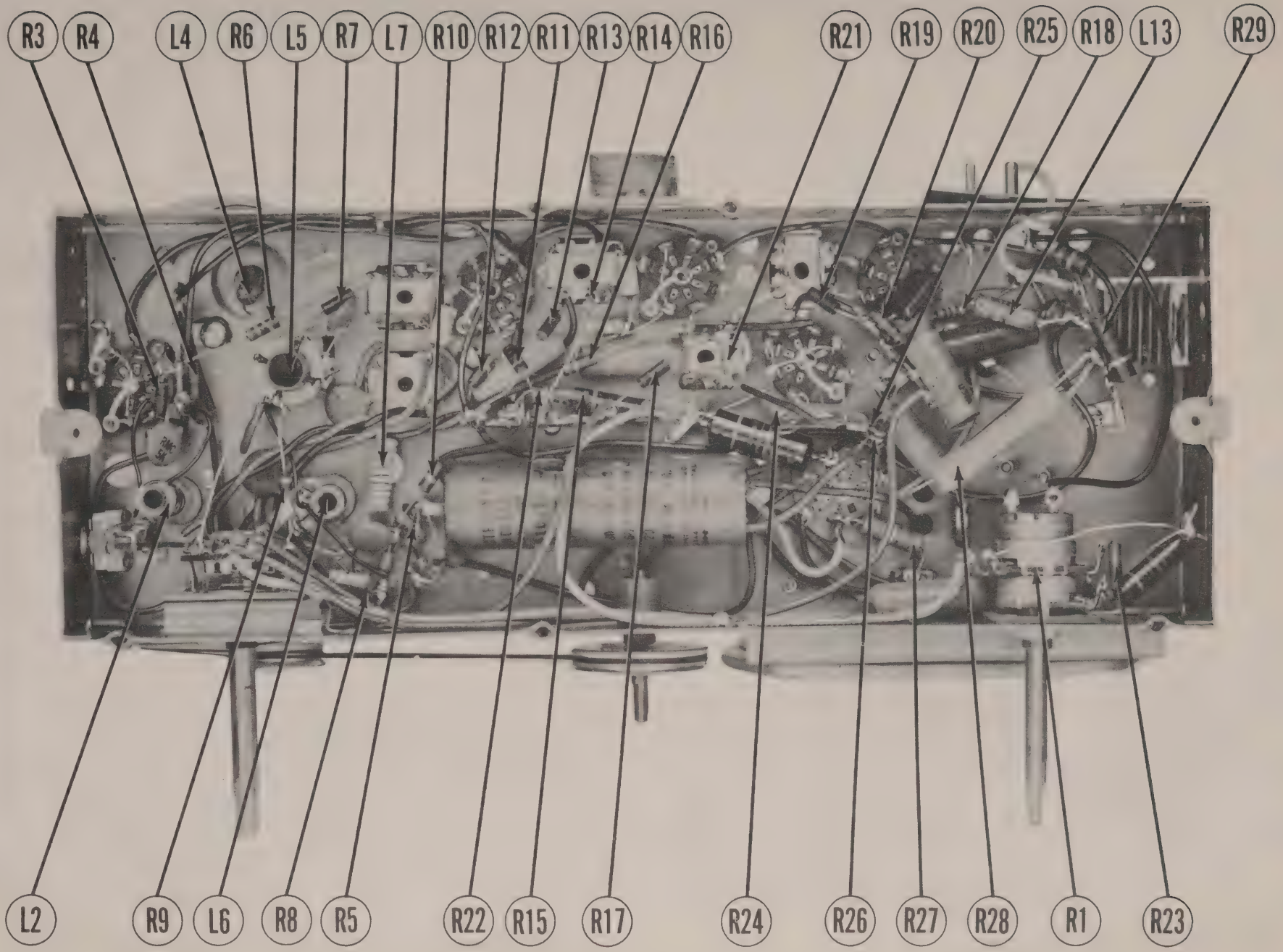

10.7MC
455KC
10.7MC
455KC
PRI.
10.7MC
C6
C7
C19
C14
C15
A12
A3
C16
C18
C17
A9
C20
A1
A7
C23
A
B
C3
C31
C2
C25
A14
90MC
RF
C35
M3
C10
C13
C11
C8
C9
C12
C21
C22
C1
C30
C26
C24
C27
C29
C28


R3
R4
L4
R6
L5
R7
L7
R10
R12
R11
R13
R14
R16
R21
R19
R20
R25
R18
L13
R29
L2
R9
L6
R8
R5
R22
R15
R17
R24
R26
R27
R28
R1
R23

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD.	High side to stator on rear section of tuning gang. Low side to chassis.	455KC (400~Mod.)	AM (CW)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1615KC	"	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	Tune for max. output.	"	A6	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ(± 1%) resistors in series from Point A to chassis. The junction of these two resistors is alignment Point C as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.1MFD	High side to Pin 1, (grid), of 12BA6, (V3). Low side to chassis.	10.7MC (Unmod.)	FM (CCW)	Tuning gang fully open.	DC probe to Point (A). Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
5.	"	High side to Pin 2, (grid), of 12AT7, (V2). Low side to chassis.	"	"	"	"	A10, A11	"
6.	"	"	"	"	"	DC probe to Point (B). Common to Point (C).	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450 sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4.	.1MFD.	High side to Pin 1, (grid), of 12BA6, (V3). Low side to chassis.	10.7MC (450KC Swp)	FM (CCW)	Point of non-interference.	Vert. amp. to Point (A). Low side to chassis.	A7, A8, A9	Disconnect stabilizor capacitor C2. Adjust for maximum amplitude and symmetry as per Fig. 1.
5.	"	High side to Pin 2, (grid), of 12AT7, (V2). Low side to chassis.	"	"	"	"	A10, A11	"
6.	"	"	"	"	"	Vert. amp. to Point (B). Low side to chassis.	A12	Reconnect capacitor C2. Adjust A12 so 10.7MC occurs at center of crossover lines as per Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	300Ω carbon resistor	High side to FM ant. terminal, (disconnect line ant.) Low side to chassis.	98MC (Unmod.)	FM	98MC	DC probe to Point (A). Low side to chassis.	A13, A14	Adjust for max. Deflection.
8.	"	"	105MC	"	Tune for max. deflection.	"	A15	"
9.	"	"	90MC	"	"	"	A14	Rock tuning gang while re-adjusting A14 for maximum deflection.

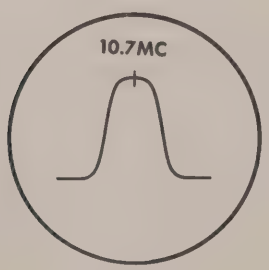


FIG. 1

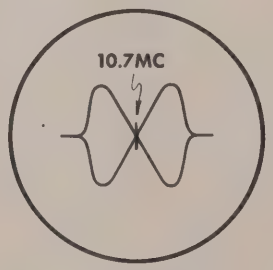


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V1	FM RF Amplifier	6BJ6	6BJ6	7CM	
V2	FM-AM Converter	12AT7	12AT7	9A	
V3	1st. FM-AM IF amp.	12BA6	12BA6	7BK	
V4	2nd. FM IF amp.	12BA6	12BA6	7BK	
V5	Ratio Detector	12AL5	12AL5	6BT	
V6	AM Detector-AVC-AF Amplifier	12AV6	12AV6	7BT	
V7	Power Output	50C5	50C5	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	80	150	V-10415	PRS150/80-40-20		EDL8415C		TVA-3455	Filter
B	60	150		PRS25/25		BR2015A		TVA-1205	Filter
C	20	25							Output Cathode
C2	4	50	V-4637	PRS150/4		BR550		TVA-1303	Stabilizing Cap.
C3	50		V-5658-10	SI50	D6-500	5W5Q5	GP1K-500	5GA-Q5	FM Line Ant. Isolation
C4	10		V-5658-7	SI10	D6-100	5W5Q1	GP1K-100	5GA-Q1	FM Ant. Isolation
C5	10		V-5658-7	SI10	D6-100	5W5Q1	GP1K-100	5GA-Q1	FM RF Coupling
C6	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	FM RF Amp. Plate
C7	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	5HK-D1	FM RF Amp. Screen
C8	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Coupling †
C9	1.5		V-5658-9	SI1.5NP0	TCZ-1.5		NP0K-1R5		RF Coupling
C10	15						N470K-150		Fixed Trimmer
C11	47		V-10710-1				N220K-470		Osc. Grid Cap.
C12	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	5HK-D1	Conv. Fil.
C13	470		R5CC21ZY471M	SI470	D6-471	5W5T5	GP2K-471	5GA-T47	Function Switch Isolation
C14	220		V-10710-2	SI220	D6-221	5W5T25	GP2K-221	5GA-T22	Mixer Plate Dec.
C15	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass
C16	100		R4CC21Y4101M	SI100	D6-101	5W5T1	GP2K-101	5GA-T1	IF Coupling
C17	.002	600	RCP10W6202M	P688-002	D6-202	PTE6D2	GP2-333-202	6TM-D2	1st. IF Amp. Screen
C18	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	1st. IF Amp. Fil.
C19	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	5HK-D1	AM IF Coupling ‡
C20	100		R4CC21Y4101M	SI100	D6-101	5W5T1	GP2K-101	5GA-T1	AVC Filter
C21	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	AVC Filter
C22	.002	600	RCP10W6202M	P688-002	D6-202	PTE6D2	GP2-333-202	6TM-D2	2nd. IF Amp. Dec.
C23	330	500	RCM20A331M	1468-00035	D6-331		GP2K-331	1FM-335	RF Bypass
C24	.001	600	RCP10W6102M	P688-001	D6-102	PTE6D1	GP2L-102	6TM-D1	De-Emphasis
C25	.02	200	RCP10W2203M	P488-02	DF-203	P488-02		2TM-S2	Audio Coupling
C26A	220		V-9634-1	SI220	D6-221	5W5T25	GP2K-221		Diode RF Filter
B	.002			P688-002	D6-202	6TM-D2	GP2-333-202	34C3	Audio Coupling
C	220			SI220	D6-221	5W5T25	GP2K-221		AF Amp. Plate
D	.005			P688-005	D6-502	6TM-D5	GP2-333-502		Audio Coupling
C27	.005	400	V-5596	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Tone Comp. ‡
C28	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Tone Comp.
C29	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Power Output Plate
C30	.047	400	V-10157-4473M	P488-047	DF-503	PTE4S5		4TM-S5	Line Filter
C31	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	5HK-D1	RF Bypass
C32	.05	200	RCP10W2503M	P288-05	DF-503	PTE4S5		2TM-S5	Loop Ant. Isolation
C33	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	FM RF Amp. Grid †
C34	800		V-9863-1	BPD-0008	DD-801	1W5T8	801-001	5HK-D1	Sw. Shaft Isolation *
C35	47		V10710-1				N220K-470		Fixed Trimmer

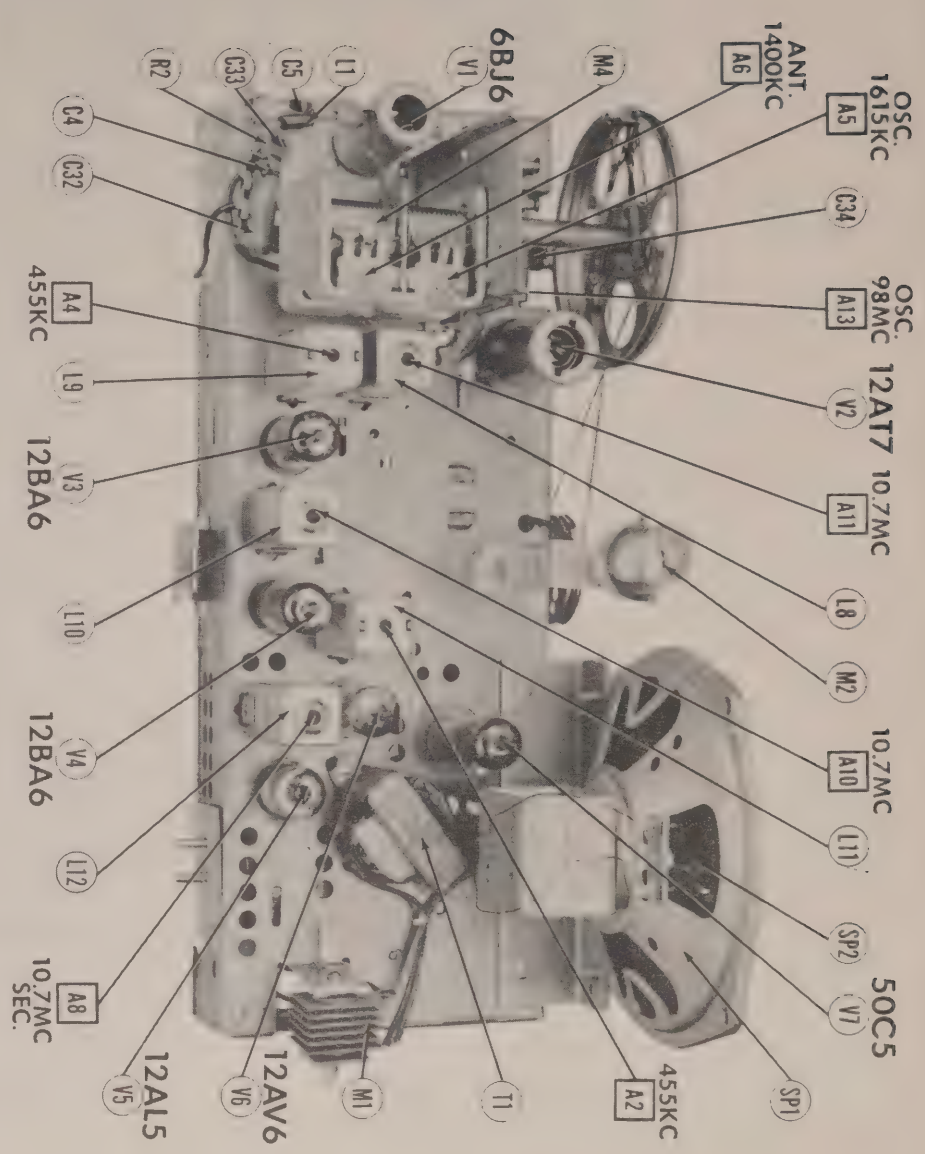
† Some Models use 800MMF in this application (Part No. V-9863-1)
‡ Some Models use .01MFD in this application (Part No RCP10W4103M)
* Not used in all Models

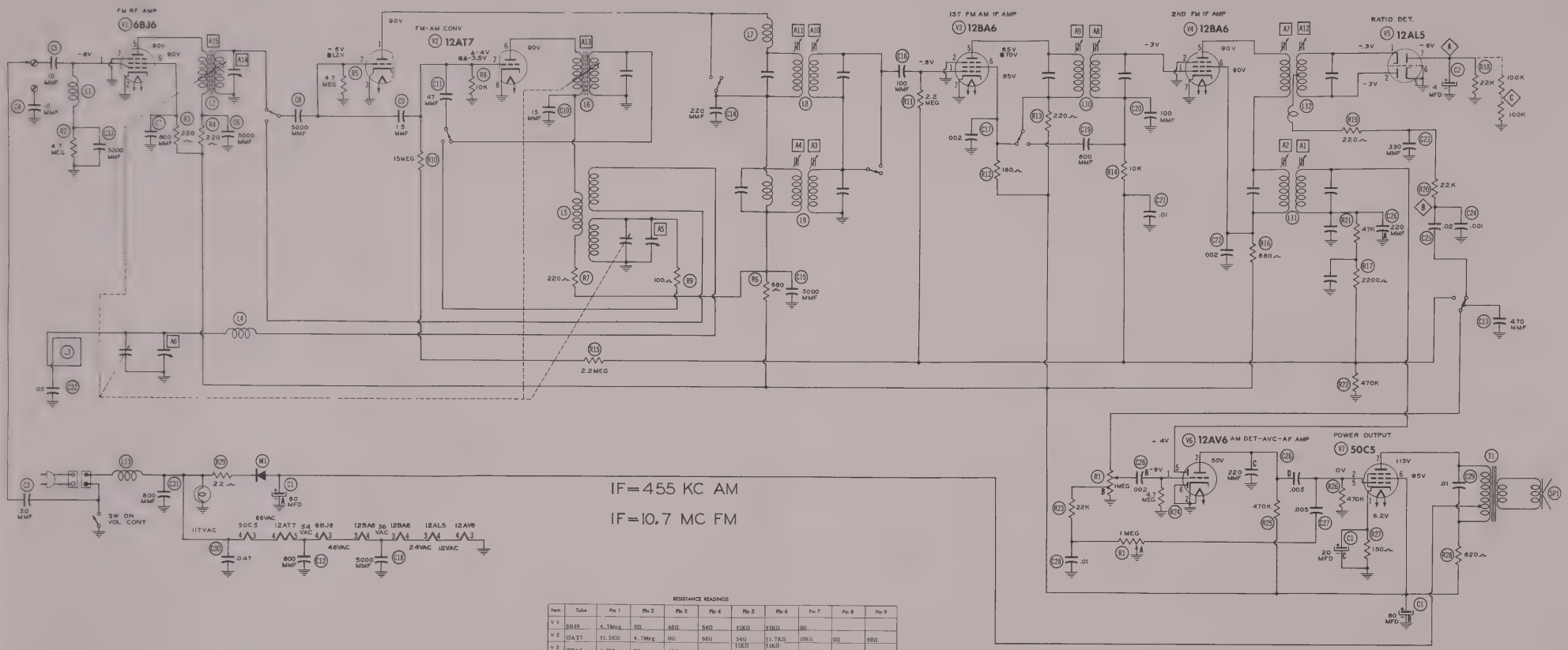
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1Meg	1/2	V-10330-2	Concentrikit B11-137*		SBBT-687-S	Tone Control - Panel
B	1Meg	1/2		B18-137XA*			Volume Control and SW Tapped @150K-Rear
C	Shaft			E-202*			Attach per instructions in Concentrikit
D	Switch			76-1*			Attach per instructions in Concentrikit

*Additional Parts To Be Used With "Concentrikit"

CHASSIS—TOP VIEW





RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BJ6	4.7MegΩ	0Ω	48Ω	54Ω	92KΩ	92KΩ	0Ω		
V 2	12AT7	11.5KΩ	4.7MegΩ	0Ω	66Ω	54Ω	11.7KΩ	10KΩ	0Ω	66Ω
V 3	12BA6	4.9MegΩ	0Ω	48Ω	38Ω	11KΩ ■13KΩ	11KΩ ■11KΩ	0Ω		
V 4	12BA6	2.7MegΩ	0Ω	38Ω	24Ω	11.5KΩ	11.5KΩ	0Ω		
V 5	12AL5	Inf.	Inf.	24Ω	12Ω	0Ω	0Ω	22KΩ		
V 6	12AV6	4.7MegΩ	0Ω	0Ω	12Ω	520KΩ	0Ω	†470KΩ		
V 7	50C5	150Ω	470KΩ	66Ω	48Ω	470KΩ	†820Ω	†240Ω		

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS NOTED
† MEASURED FROM OUTPUT OF M1
■ MEASURED IN AM POSITION
▲ TAKEN WITH VACUUM TUBE VOLTMETER

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	Westinghouse PART No.	IRC PART No.	
R2	4.7Meg	½	RC20AE475M	BTS-4.7Meg	FM-RF Amp. Grid
R3	220Ω	½	RC20AE221M	BTS-220	FM-RF Amp. Screen
R4	220Ω	½	RC20AE221M	BTS-220	FM-RF Amp. Plate Decoupling
R5	4.7Meg	½	RC20AE475M	BTS-4.7Meg	Mixer Grid
R6	680Ω	½	RC20AE681M	BTS-680	Decoupling
R7	220Ω	½	RC20AE221M	BTS-220	FM-AM Osc. Decoupling
R8	10KΩ	½	RC20AE103M	BTS-10K	FM-AM Osc. Grid
R9	100Ω	½	RC20AE101M		Parasitic Suppressor
R10	15Meg	½	RC20AE156M	BTS-15Meg	AVC Network
R11	2.2Meg	½	RC20AE225M	BTS-2.2Meg	1st FM-AM IF Amp. Grid
R12	180Ω	½		BTS-180	1st FM-AM IF Amp Screen - See Note 1
R13	2200Ω	½	RC20AE222M	BTS-2200	1st FM-AM IF Amp. Plate
R14	10KΩ	½	RC20AE103M	BTS-10K	2nd FM IF Amp. Grid - See Note 2
R15	2.2Meg	½	RC20AE225M	BTS-2.2Meg	AVC Network
R16	680Ω	½	RC20AE681M	BTS-680	Voltage Divider
R17	2200Ω	½	RC20AE222M	BTS-2200	AVC Network
R18	22KΩ	½	RC20AE223K	BTS-22K	Ratio Detector Diode Load
R19	220Ω	½	RC20AE221M	BTS-220	Balancing
R20	22KΩ	½	RC20AE223M	BTS-22K	DeEmphasis
R21	47KΩ	½	RC20AE473M	BTS-47K	Detector Diode RF Filter
R22	470KΩ	½	RC20AE474M	BTS-470K	AVC Network
R23	22KΩ	½	RC20AE223M	BTS-22K	Tone Compensation
R24	4.7Meg	½	RC20AE475M	BTS-4.7Meg	AF Amp. Grid
R25	470KΩ	½	RC20AE474M	BTS-470K	AF Amp. Plate
R26	470KΩ	½	RC20AE474M	BTS-470K	Output Grid
R27	150Ω	1	RC30AE151K	BTA-150	Output Cathode
R28	820Ω	5	V-6984-10	1 3/4A-800	Voltage Divider-Wire Wound
R29	22Ω	1	RC30AE220K		Surge Limiter

Note 1 Some Models use 680Ω Resistor in this application
Note 2 Some Models use 2.2Meg resistor in this application

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	1.9KΩ	2.9Ω	240Ω tapped @ 8.5Ω	.7Ω	V-10660	A-3330	A-3031	RO-3	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	Westinghouse PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	2.9Ω	V-9641-2	ST-105 Mod. P5-X	52A1	
	CONE DIA.	V. C. DIA.				
SP2	4 9/16"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	Westinghouse PART No.	IRC PART No.	
L1	FM Ant. Coil	0Ω		V-10644-1		
L2	FM RF Coil	0Ω	0Ω	V-10642-1		
L3	AM Loop Ant.	2Ω		V-10672-1		
L4	AM Ant. Coil	2.2Ω		V-9099-5	CLA	2.7 Microhenries
L5	AM Osc. Coil	4.5Ω	9.5Ω	V-10641-1		Tertiary Winding 2.5Ω
L6	FM Osc. Coil	0Ω	0Ω	V-10643-1		
L7	Parasitic Supp.	0Ω		V-4886-13		
L8	1st. FM IF	1Ω	2Ω	V-9688		
L9	1st. AM IF	5Ω	12Ω	V-10619		Tap at 15.5Ω
L10	2nd. FM IF	1.8Ω	1.8Ω	V-9642		
L11	2nd. AM IF	15Ω	15Ω	V-10350-1		
L12	Ratio Det. Trans.	2.8Ω	.4Ω	V-9828		Tap at .6Ω
L13	Line Choke	.85Ω		V-9099-1	CLA	1.2 Microhenries

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	Westinghouse PART No.	SYLVANIA PART No.	SELETRON PART No.	
M1	.075A	V-9640	NC-5	5M1	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					Westinghouse PART No.		
M2	Bayonet	110	6	Clear	6S6DC		

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M3	Switch	V-10651-1	Band
M4	Tuning Cap	V-10662-2	AM Sections (22-487MMF, 27-176MMF)
	Cabinet	V-1233-3	Brown
	Cabinet	V-1233-4	Ivory
	Dial	V-10308-1	
	Pointer	V-10310-1	
	Knob	V-9104-9	Tuning (Brown) Rear
	Knob	V-9104-10	Tone (Brown) Rear
	Knob	V-9104-11	Tuning (Ivory) Rear
	Knob	V-9104-12	Tone (Ivory) Rear
	Knob	V-10408-1	Band (Brown)
	Knob	V-10408-2	On-Off-Vol. (Brown)
	Knob	V-10408-3	Band (Ivory)
	Knob	V-10408-4	On-Off-Vol. (Ivory)

PHOTOFACT* Folder

WESTINGHOUSE MODELS H648T20, H649T17, H650T17 H651K17, H652K20, H655K17, H656K17, H657K17 H659T17, H662K20, H663T17, H664K17

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MODEL H657K17

WESTINGHOUSE MODELS H648T20, H649T17, H650T17 H651K17, H652K20, H655K17, H656K17, H657K17 H659T17, H662K20, H663T17, H664K17

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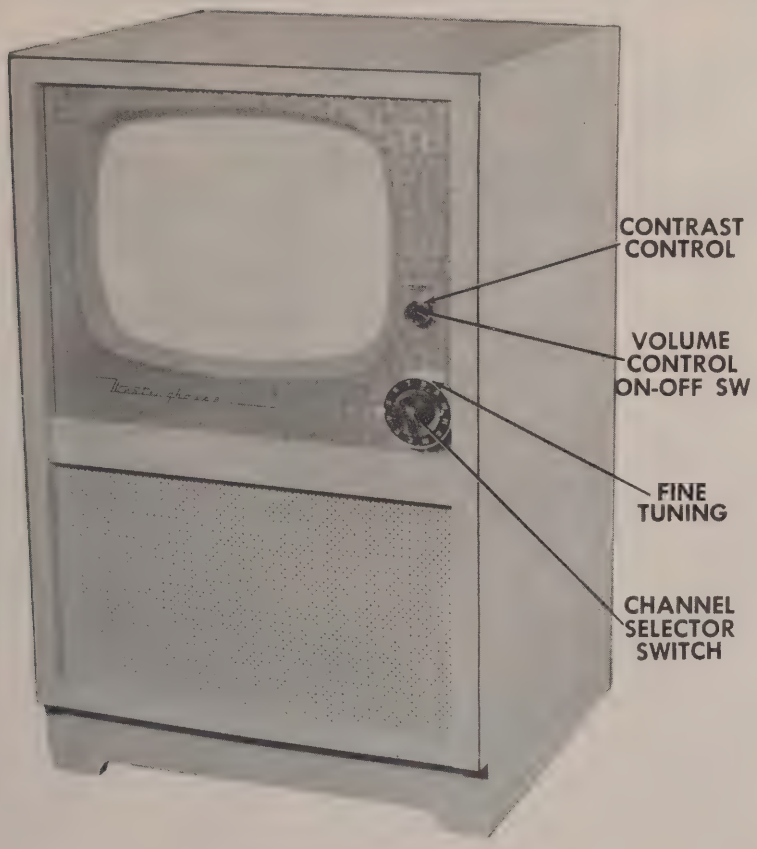
DATE 12–51 SET 154 FOLDER 15

PHOTOFACT* Folder

*TRADE MARK

WESTINGHOUSE MODELS H648T20, H649T17, H650T17, H651K17, H652K20, H655K17, H656K17, H657K17, H659T17, H662K20, H663T17, H664K17



WESTINGHOUSE MODEL H657K17

TRADE NAME	Westinghouse Models H648T20 (Ch. V-2201-1), H649T17, H650T17, H651K17 (Ch. V-2200-1) , H652K20 (Ch. V-2201-1), H655K17, H656K17, H657K17 (Ch. V-2200-1), H659T17 (Ch. V-2204-1), H662K20 (Ch. V-2201-1), H663T17(Ch. V-2204-1) H664K17 Ch. V-2200-1).
MANUFACTURER	Westinghouse Electric Corp., Home Receiver Div., Sunbury, Pa.
TYPE SET	Television Receiver
TUBES	Twenty Two
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	1.82 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13.

INDEX

Alignment Instructions 6
Disassembly Instructions 10
Horizontal Sweep Circuit Adjusts 10
Parts List and Descriptions 12, 13, 15
Photographs
Cabinet-Rear View 10
Capacitor and Alignment Identification 4, 9
Photographs (cont.)
Chassis - Top View 3
RF Tuner 7
Resistor and Inductor Identification 11, 14
Resistance Measurements 8
Schematic 2
Tube Placement Charts 5

WESTINGHOUSE MODELS H648T20, H649T17, H650T17, H651K17, H652K20, H655K17, H656K17, H657K17, H659T17, H662K20, H663T17, H664K17

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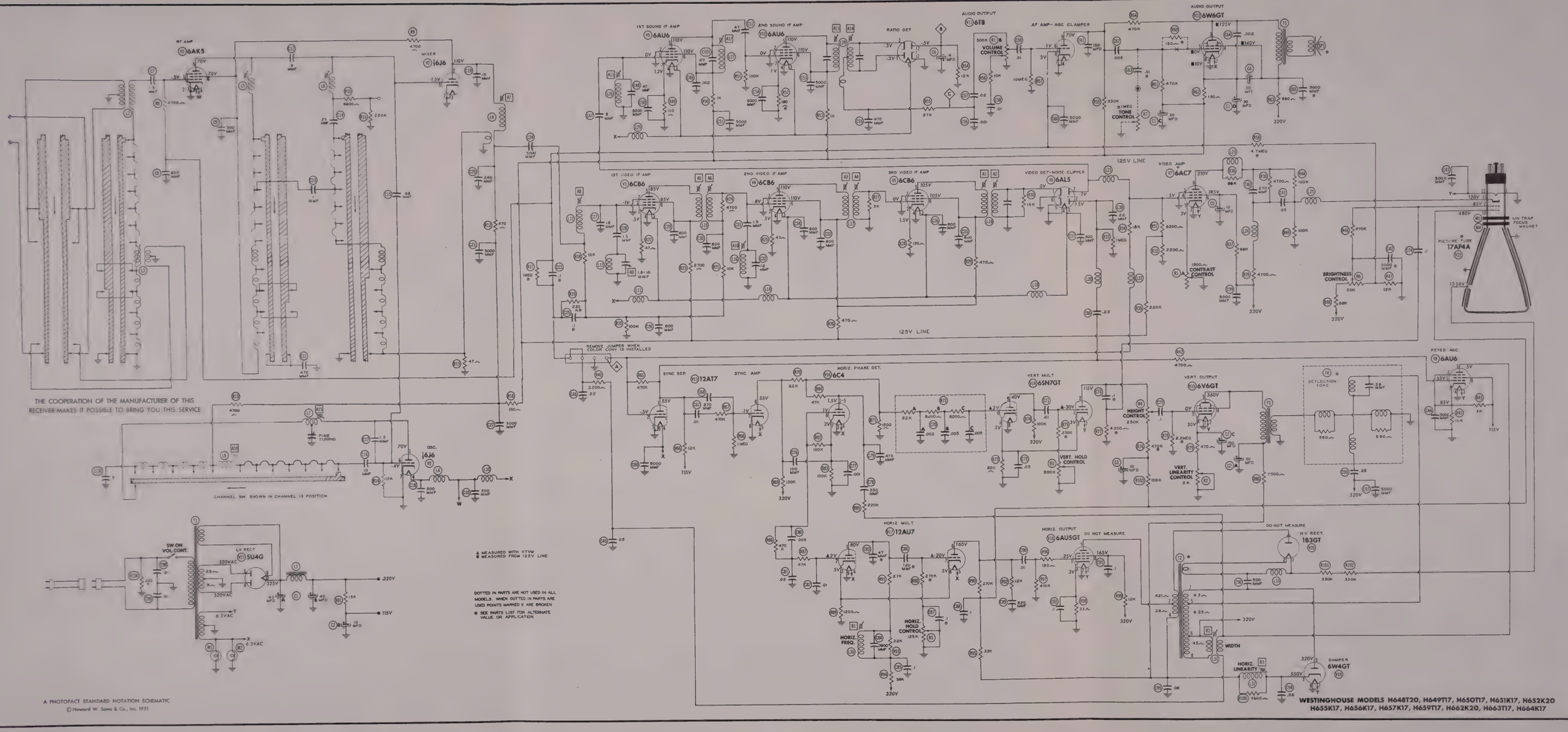

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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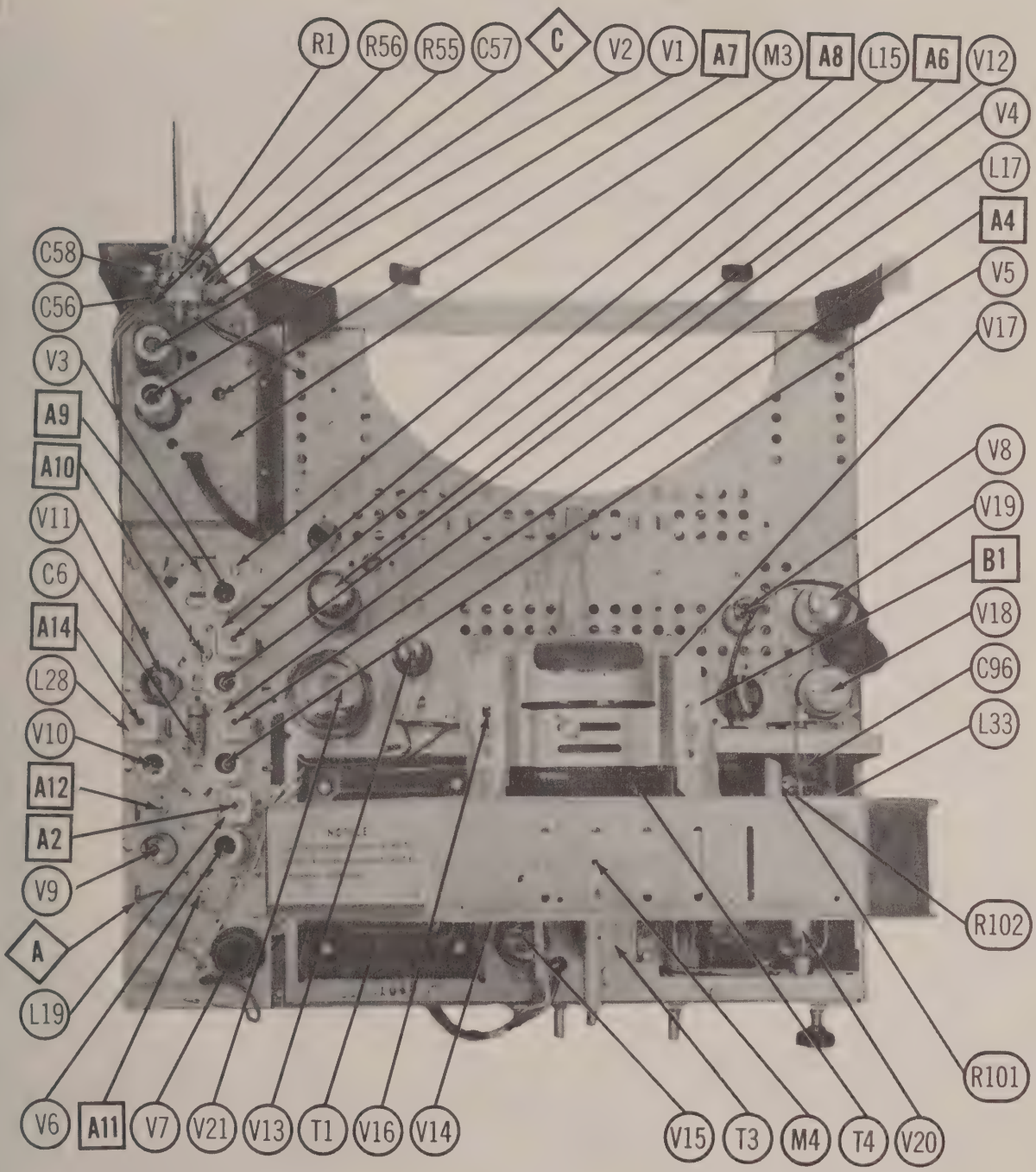
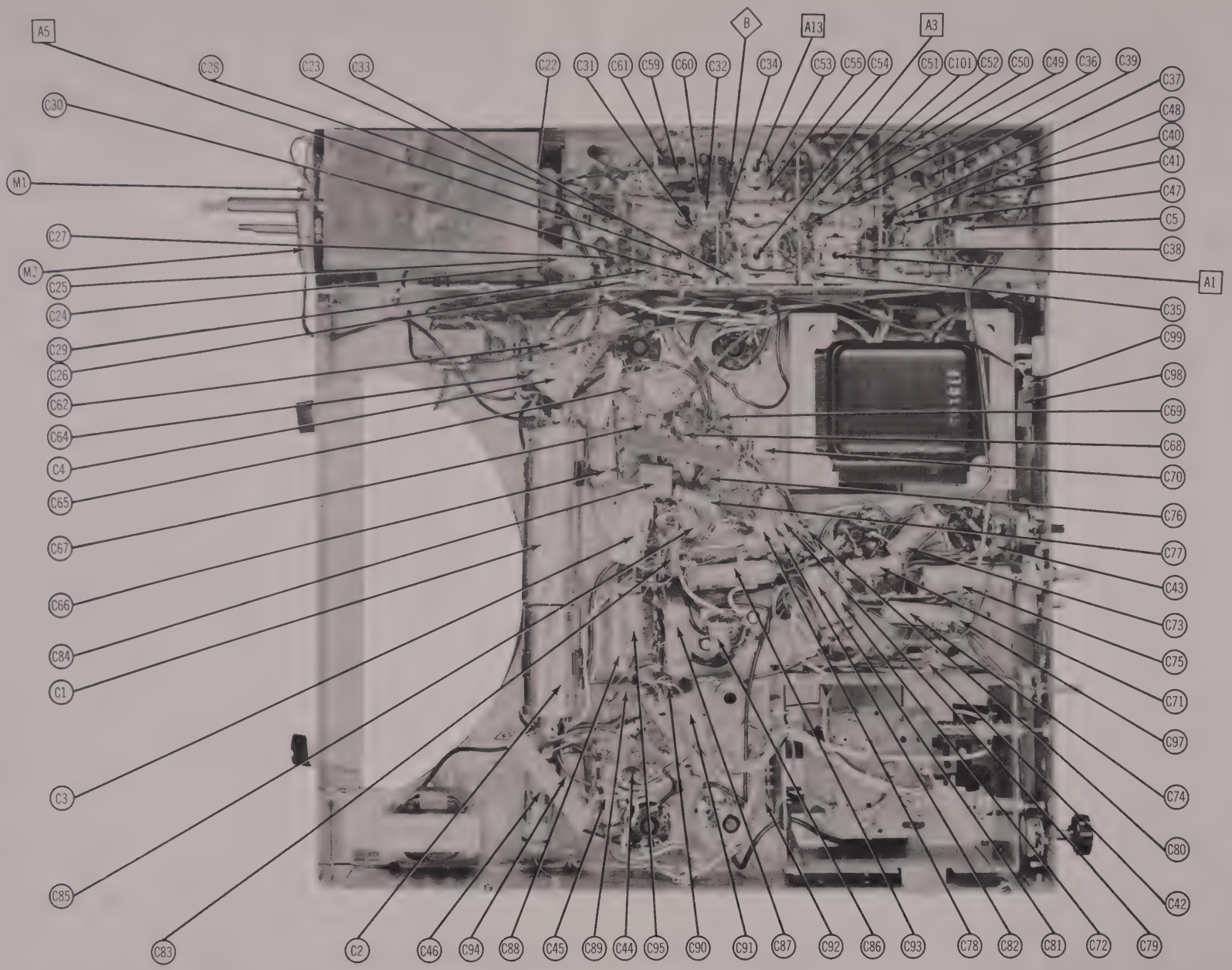
WESTINGHOUSE MODELS H648T20, H649T17, H650T17, H651K17, H652K20 H655K17, H656K17, H657K17, H659T17, H662K20, H663T17, H664K17

WESTINGHOUSE MODELS H648T20, H649T17, H650T17, H651K17, H652K20, H655K17, H656K17, H657K17, H659T17, H662K20, H663T17, H664K17



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

WESTINGHOUSE MODELS H648T20, H649T17, H650T17, H651K17, H652K20, H655K17, H656K17, H657K17, H659T17, H662K20, H663T17, H664K17

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube, (V2), and replace it with a 6J6 which has pin 1 removed, this will disable the local oscillator and prevent the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to ungrounded lead of R20, connect the positive lead to chassis.
During steps 1, 2, and 3 of video IF alignment it is necessary to detune the primary of the transformer feeding the tube to which the sweep generator is connected. This may be done by clipping an alligator clip to pin 5 of the preceeding tube, the stray capacity thus added will be sufficient to detune the primary winding. CAUTION B+.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to pin 1, (Grid) of 6CB6, (V5). Low side to chassis.	44MC (10MC SWP)	42.25MC 45.75MC	Any	Vert. Amp. thru 47KΩ to Point (A). Low side to chassis.	A1, A2	Adjust A1 for maximum amplitude of response and A2 for symmetrical response as shown in figure 1.
2.	"	High side to pin 1, (Grid) of 6CB6, (V4). Low side to chassis.	"	"	"	"	A3, A4	Adjust A3 for maximum amplitude and A4 for symmetrical response as shown in figure 2.
3.	"	High side to pin 1, (Grid) of 6CB6, (V3). Low side to chassis.	"	"	"	"	A5, A6	Adjust A5 for maximum amplitude and A6 for symmetrical response as shown in figure 3.
4.		High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	"	"	"	"	A7, A8	Detune A9 fully counter-clockwise. Adjust A7 for maximum amplitude and A8 for symmetrical response.
5.	"	"	"	41.25MC	"	"	A9	Adjust for MINIMUM marker indication at the 41.25MC point on response curve.
6.	"	"	"	42.25MC 45.75MC	"	"		Check for response curve similar to figure 4. If necessary retouch A7 and A8 for proper response.
7.	"	High side to pin 1, (Grid) of 6CB6, (V3). Low side to chassis.	"	47.25MC	"	"	A10	Adjust for MINIMUM marker indication at the 47.25MC point on response curve. In some cases adjustment of A10 will effect adjustment of A5 and A6. In that event repeat steps 3, 4 and 6.

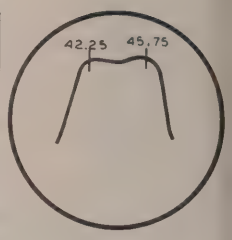


FIG. 1

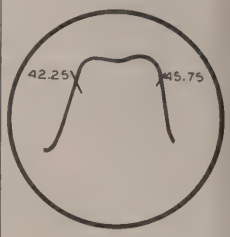


FIG. 2

SOUND IF ALIGNMENT

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.001MFD.	High side to Point A. Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any	Vert. Amp. to Point (B). Low side to chassis.	A11, A12, A13	Disconnect stabilizer capacitor C6. Adjust for maximum amplitude and symmetry as per figure 5.
9.	"	"	"	"	"	Vert. Amp. to Point (C). Low side to chassis.	A14	Reconnect capacitor C6. Adjust A14 so 4.5MC occurs at center of crossover lines as per figure 6. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

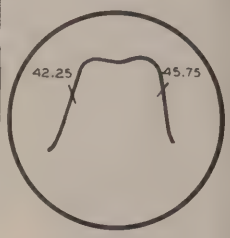


FIG. 3

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. Amp. to Point (A). Low side to chassis.	A15	Adjust to place video marker at 50% on response curve as shown in figure 7.
11.	"	"	207MC (10MC SWP)	205.25MC 209.75MC	12	"		Check all high band channels to see if the video marker can be properly placed well within the range of the fine tuning control. If not make compromise adjustment of A15
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			
12.	"	"	85MC (10MC SWP)	83.25MC 87.75MC	6	"	A16	Adjust to place video marker at 50% on response curve as shown in figure 7.
13.	"	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"		Check all low band channels to see if the video marker can be properly placed well within the range of the fine tuning control. If not, make compromise adjustment of A16.
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

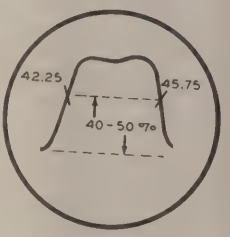


FIG. 4

FIG. 5

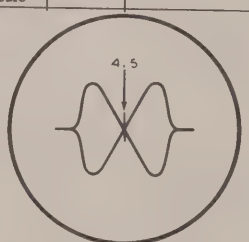


FIG. 6

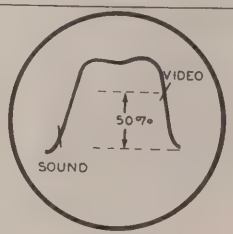
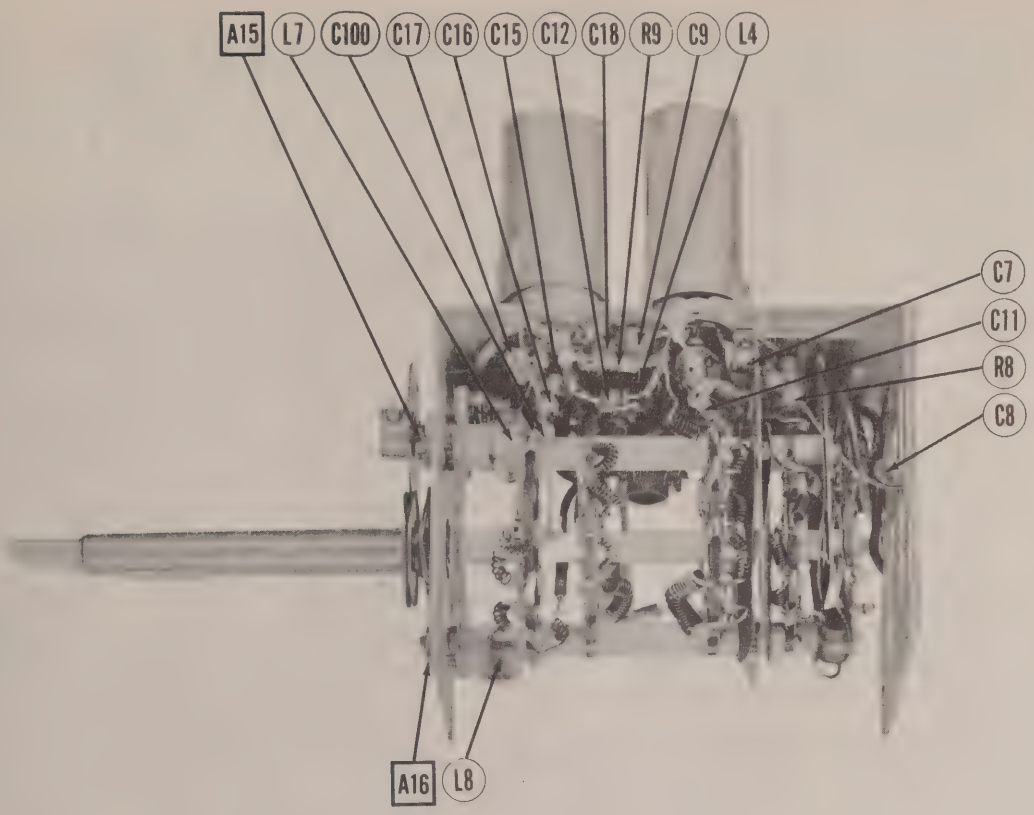
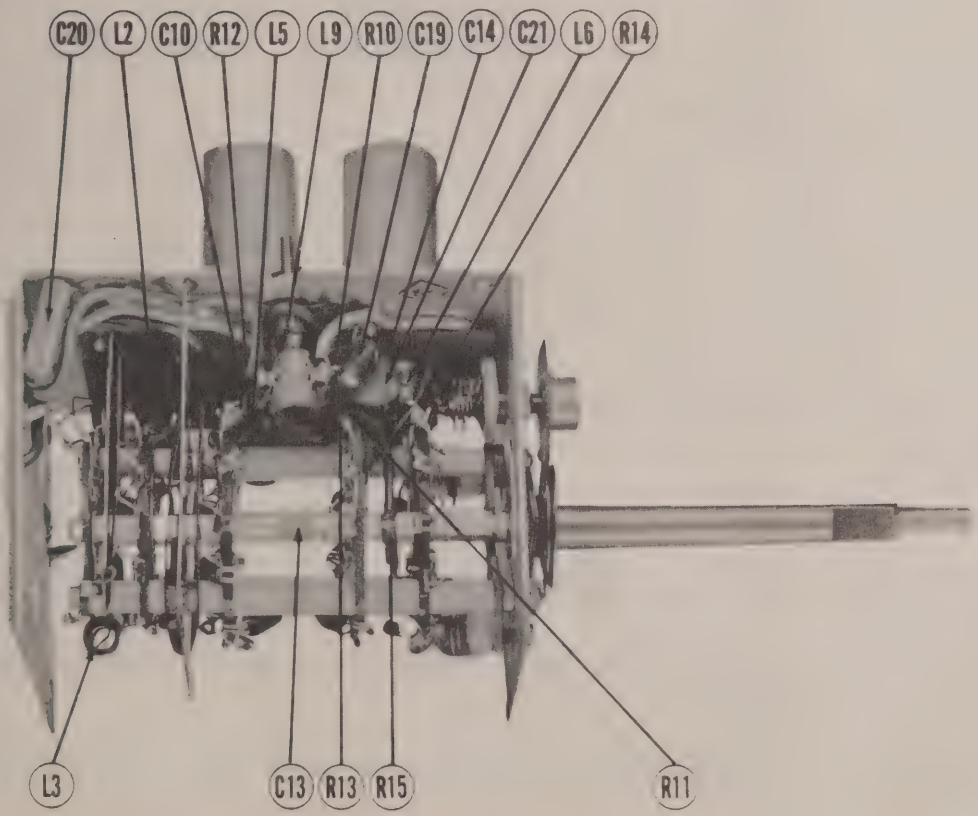


FIG. 7



RF TUNER-RIGHT SIDE



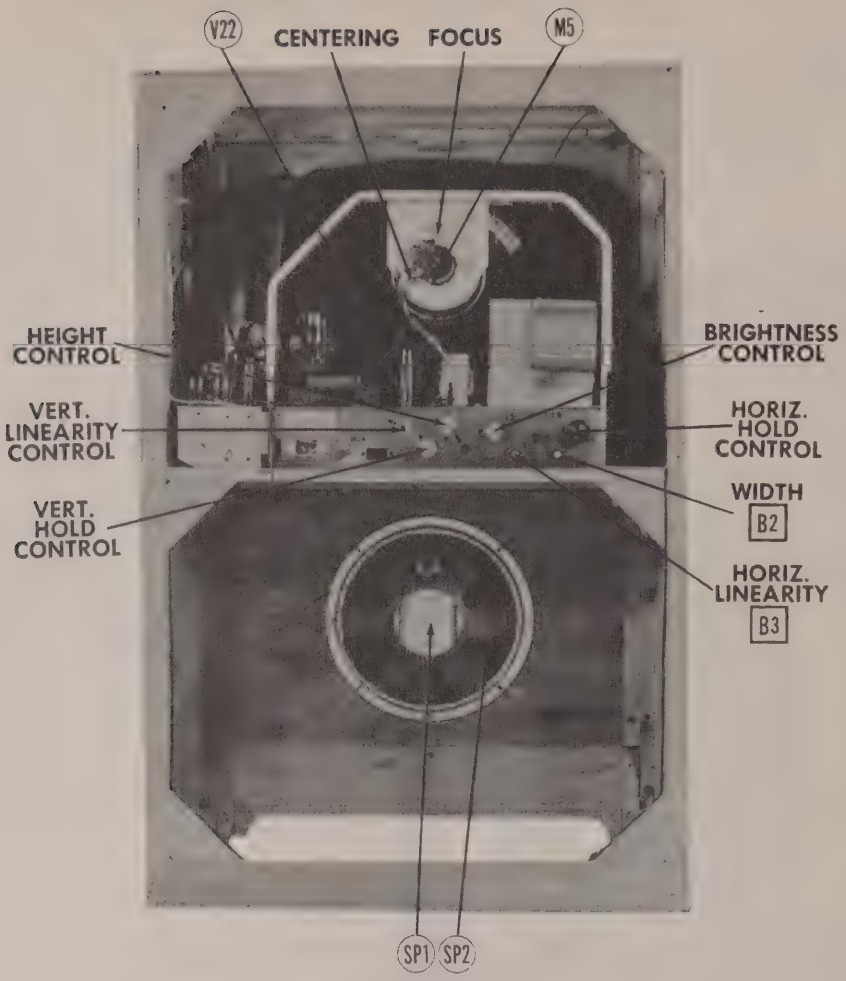
RF TUNER-LEFT SIDE

RESISTANCE MEASUREMENTS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AK5	1.3Meg	0Ω	0Ω	.1Ω	■5.3KΩ	■5.3KΩ	0Ω		
V 2	6J6	■4.8KΩ	■620Ω	0Ω	.1Ω	220KΩ	15KΩ	0Ω		
V 3	6CB6	110KΩ	47Ω	.1Ω	0Ω	■2.7KΩ	■2.7KΩ	0Ω		
V 4	6CB6	110KΩ	47Ω	.1Ω	0Ω	■470Ω	■470Ω	0Ω		
V 5	6CB6	.4Ω	150Ω	.1Ω	0Ω	■940Ω	■940Ω	0Ω		
V 6	6AL5	.5Ω	1Meg	1.4Ω	0Ω	0Ω	0Ω	10KΩ		
V 7	6AC7	0Ω	0Ω	0Ω	10KΩ	110Ω	†68KΩ	.1Ω	†9.4KΩ	
V 8	6AU6	†31KΩ	†12KΩ	.1Ω	0Ω	320KΩ	†11KΩ	†12KΩ		
V 9	6AU6	1.1Ω	0Ω	.1Ω	0Ω	■1KΩ	■1KΩ	150Ω		
V 10	6AU6	100KΩ	0Ω	.1Ω	0Ω	■1KΩ	■1KΩ	180Ω		
V 11	6T8	Inf.	12KΩ	Inf.	0Ω	.1Ω	1.2Meg	0Ω	10Meg	■200KΩ
V 12	6W6GT	Inf.	0Ω	†950Ω	†720Ω	■470KΩ	12KΩ	.1Ω	■150Ω	
V 13	12AT7	†27KΩ	28KΩ	0Ω	.1Ω	.1Ω	†30KΩ	1Meg	0Ω	0Ω
V 14	6SN7GT	560KΩ	#850KΩ	820Ω	40KΩ	†100KΩ	820Ω	.1Ω	0Ω	
V 15	6V6GT	0Ω	.1Ω	#8.1KΩ	#8.1KΩ	2.2Meg	4.3KΩ	0Ω	1.3KΩ	
V 16	6C4	†65KΩ	Inf.	0Ω	.1Ω	†65KΩ	200KΩ	100KΩ		
V 17	12AU7	†85KΩ	715KΩ	1.2KΩ	.1Ω	.1Ω	#300KΩ	340KΩ	1.2KΩ	0Ω
V 18	6AU5	470KΩ	.1Ω	33Ω	Inf.	#50Ω	Inf.	0Ω	†12KΩ	
V 19	6W4GT	Inf.	Inf.	130KΩ	Inf.	†55Ω	Inf.	.1Ω	0Ω	
V 20	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP #510Ω
V 21	5U4G	Inf.	15KΩ	Inf.	31Ω	Inf.	29Ω	Inf.	15KΩ	
V 22	17AP4A	0Ω	†560KΩ	PIN 10 #33KΩ	PIN 11 †60KΩ	PIN 12 .1Ω				

ALL CONTROLS SET FOR NORMAL OPERATION
† MEASURED FROM PIN 2 OF V21
# MEASURED FROM PIN 3 OF V19
■MEASURED FROM 125V LINE



CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

1. Remove five push-on type control knobs.
2. Remove eight wood screws from rear cover. Remove rear cover.
3. Disconnect built-in antenna.
4. Disconnect speaker.
5. Remove four 5/16" hex head bolts from chassis: Remove chassis.
6. Remove four 1/4" hex nuts from speaker. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE THE CHASSIS AS OUTLINED ABOVE.

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

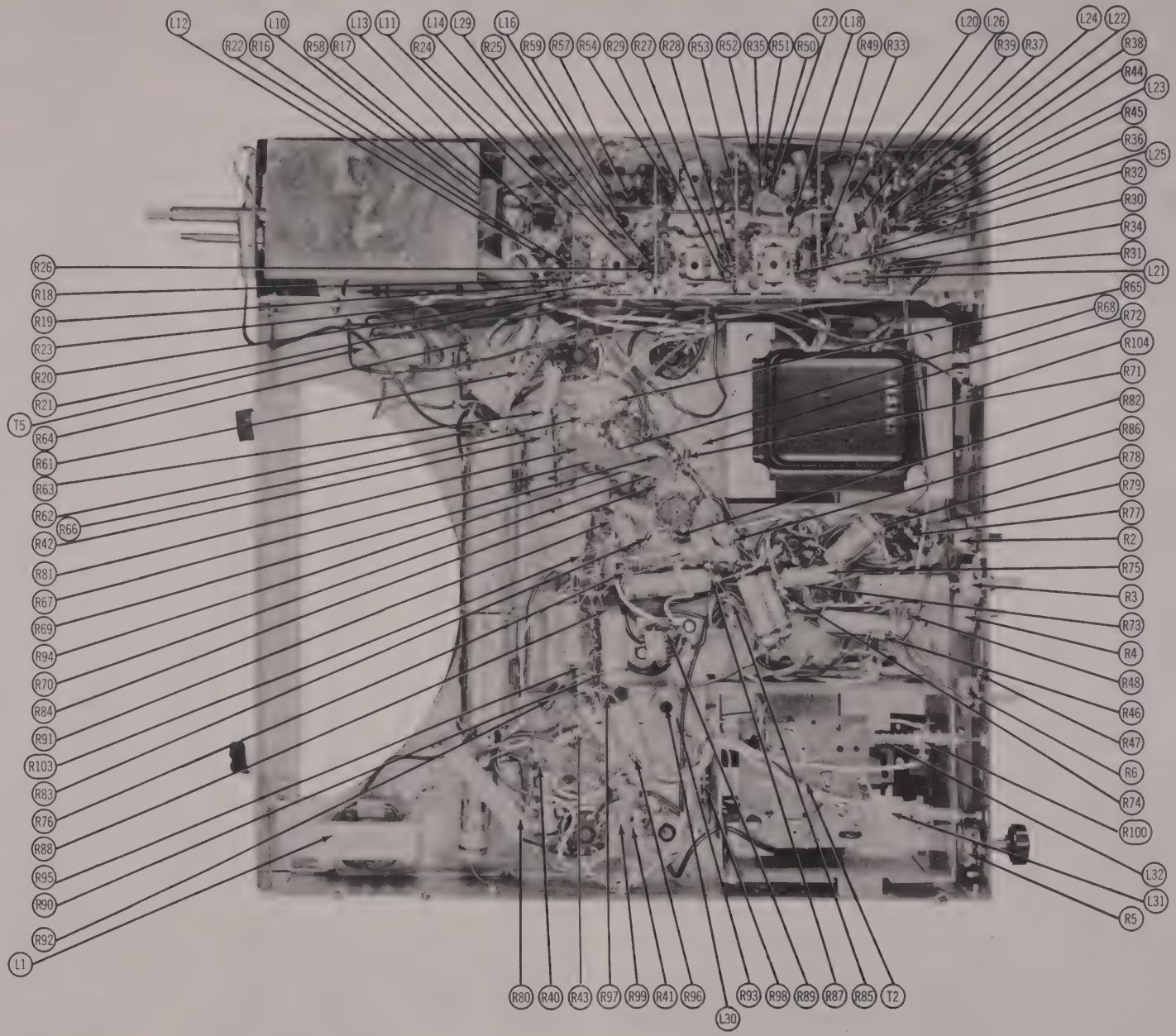
Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal frequency slug. (B1), to the center of the range over which the picture synchronizes horizontally.

Adjust the width slug, (B2), until the picture is slightly wider than necessary to fill the mask horizontally.

Adjust the horizontal linearity slug, (3) until the picture is symmetrical from left to right.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	EIA BASE TYPE	NOTES
V1	RF Amplifier	6AK5	6AK5	7BD	
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF Amp	6CB6	6CB6	6CK	
V4	2nd Video IF Amp	6CB6	6CB6	6CK	
V5	3rd Video IF Amp.	6CB6	6CB6	6CK	
V6	Video Detector-Noise Clipper	6AL5	6AL5	6BT	
V7A	Video Amplifier	6AC7	6AC7	8N	
B	Video Amplifier	6AH6	6AH6	7BK	
V8	Keyed AGC	6AU6	6AU6	7BK	
V9	1st Sound IF Amp.	6AU6	6AU6	7BK	
V10	2nd Sound IF Amp	6AU6	6AU6	7BK	
V11	Ratio Detector-AGC Clamp AF Amp	6T8	6T8	9E	
V12	Audio Output	6W6	6W6	7S	
V13	Sync Separator-Sync. Amplifier	12AT7	12AT7	9A	
V14	Vertical Mult.	6SN7GT	6SN7GT	8BD	
V15	Vertical Output	6V6GT	6V6GT	7AC	
V16	Horiz. Phase Det.	6C4	6C4	6BG	
V17	Horiz. Mult.	12AU7	12AU7	9A	
V18	Horiz. Output	6AU5	6AU5	6CK	
V19	Damper	6W4GT	6W4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: WESTINGHOUSE PART No.	SYLVANIA PART No.	THOMAS PART No.	RTMA BASE TYPE	NOTES
V22A	17AP4A	17AP4A	17BP4	12D	
B	20DP4	20DP4		12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WESTINGHOUSE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	V-9891	AFH4-93		UPT4445-3335		TVL-4720	▲ Filter
B	40	450							■ Filter
C	30	350							▲ Decoupling
D	30	350							Audio Output Cathode
C2A	30	450	V-10306-1	AFH4-87		UPT4145-V10		TVL-3753	▲ Vert. Output Dec.
B	10	450							■ Decoupling
C	150	50							▲ Vert. Output Cathode
C3	10	450	V-10293-1	PRS450/10		BR1045A		TVA-1705	Decoupling
C4	30	450	V-8570	PRS450/30		BR3045A		TVA-1711	Audio Output Dec.
C5	10	250	V-10117	PRS250/12		BR1225A		TVA-1504	Video Amp. Screen
C6	4	50	V-4637	PRS150/4		BR550		TVA-1303	Stabilizing Cap.
C7	1.5		V-9926-1	SIl. 5NP0	TCZ-1.5		NP0K-1R5		RF Coupling
C8	800		V-9863-1	BPD-0008	DD-801		801-001	5HK-D1	AGC Filter
C9	500			SI500	D6-501		GP2K-501	5GA-T5	RF Amp. Screen
C10	500			S1500	D6-501		GP2K-501	5GA-T5	RF Amp. Fil.
C11	470			SI470	D6-471		GP2K-471	5GA-T47	RF Amp. Plate
C12	.9						NP0K-R90		RF Coupling
C13	1				TCZ-1		NP0K-010		RF Coupling
C14	25			S125	D6-250		GP1K-250	5GA-Q25	RF Coupling
C15	.68				TCZ-.68		NP0K-R68		Osc. Coupling
C16	10			SI10NP0	TCZ-10		NP0K-100	5TCC-Q1	Osc. Grid Cap.
C17	1.5		V-9926-1				N330K-1R5		Osc. Feedback
C18	500			S1500	D6-501		GP2K-501	5GA-T5	Conv. Fil.
C19	15			SI15	D6-150		GP1K-150	5GA-Q15	Fixed Trimmer
C20	240	500		1468-00025		5WST25	GP2K-241	1FM-325	Conv. Plate Dec.
C21	5000		V-5596	BPD-005	DD-502		811-005	5HK-D5	RF Bypass
C22	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass
C23	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	RF Bypass ♦
C24	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	IF Coupling
C25	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	AGC Filter ♦
C26	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	AGC Filter
C27	12			R3CC20SL120K	SIl2		GP1K-120		Fixed Trimmer
C28	1.5		V-9926-1	SIl. 5NP0	TCZ-1.5		NP0K-1R5		IF Coupling
C29	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	1st. Video IF Dec.
C30	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	AGC Filter
C31	1.5		V-9926-1	SIl. 5NP0	TCZ-1.5		NP0K-1R5		IF Coupling
C32	12		R3CC20SL120K	SIl2	D6-120		GP1K-120		Fixed Trimmer
C33	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	2nd. Video IF Dec.
C34	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	2nd. Video IF Fil.
C35	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	3rd. Video IF Dec.
C36	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	3rd. Video IF Fil.
C37	800		V-9863-1	BPD-0008	DD-801	1WST8	801-001	5HK-D1	Video Det. Fil.
C38	22	500	RCM20B220K	1469-000025	TCZ-22	5R5Q25	NP0K-220	MS-425	RF Bypass
C39	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass
C40	270	500	RCM20B271K	1468-0003	D6-271	5WST3	GP2K-271	MS-33	Video Coupling
C41	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	Video Coupling
C42	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass ♦
C43	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Picture Tube Fil.
C44	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Keyed AGC Cathode
C45	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	AGC Filter
C46	.25	400	RCP10W4254M	P488-25		GT4P25		4TM-P25	AGC Filter
C47	4.7		V-9926-3	SI4 7NP0	TCZ-4.7		NP0K-4R7		Sound IF Coupling
C48	47	500	RCM20B470K	1469-00005		5R5Q5		MS-45	Fixed Trimmer
C49	.002	600	RCP10W6202M	P688-002	D6-202	PTE6D2	GP2-333-202	6TM-D2	1st. Sound IF Dec.
C50	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	1st. Sound IF Cathode
C51	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass
C52	47	500	RCM20B470K	1468-00005	D6-470	5W5Q5	GP1K-470	1FM-45	Sound IF Coupling
C53	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. Sound IF Dec.
C54	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	2nd. Sound IF Cathode
C55	470		R5CC20ZY471K	SI470	D6-471	5W5T5	GP2K-471	5GA-T47	RF Bypass
C56	.001	400	RCP10WZ102M	P688-001	D6-102	PTE6D1	GP2L-102	6TM-D1	De-emphasis
C57	.02	400	RCP10W4203M	P488-02	DF-203	PTE4S2		4TM-S2	Audio Coupling
C58	.01	400	RCP10W4103K	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Tone Comp.
C59	.01	400	RCP10W4103K	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Audio Coupling
C60	5000		V-5596	BPD-006	DD-502	1D5D5	811-005	5HK-D5	RF Bypass

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WESTINGHOUSE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C61	150	500	RCM20B151M	1468-00015	D6-151	5W5T15	GP2K-151	1FM-315	AF Amp. Plate
C62	.005	400	RCP10W4502M	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Audio Coupling
C63	.01	400	RCP10W4103K	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Tone Comp. *
C64	.002	600	RCP10W6202M	P688-002	D6-202	PTE6D2	GP2-333-202	6TM-D2	Audio Output Plate
C65	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass *
C66	.25	400	RCP10W4254M	P488-25		GT4P25		4TM-P25	Sync. Coupling
C67	.01	400	RCP10W4103K	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Sync. Coupling
C68	270	500	RCM20B271K	1469-0003		5R5T3		MS-33	Sync. Coupling
C69	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	Sync. Amp. Fil.
C70A	.002			P688-002		PTE6D2	GP2-333-202		Vert. Integrator Net.
B	.005		♦V-9213	P688-005	♦PC-100	PTE6D5	GP2-333-502	♦10ICI	Vert. Integrator Net.
C	.005			P688-005		PTE6D5	GP2-333-502		Vert. Integrator Net.
C71	.01	400	RCP10W4103K	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Vert. MV Feedback
C72	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	Vert MV Cathode
C73	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	Vert Sweep Coupling *
C74	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	Vert. Sweep Coupling
C75	.1	600	RCP10M6104M	P688-1	DF-104	PTE6P1		6TM-P1	Vert Sweep Coupling
C76	100	500	RCM20B101K	1468-0001	D6-101	5W5T1	GP1K-101	1FM-31	Horiz. Sync Coupling
C77	.001	400	RCP10W4102M	P688-001	D6-102	PTE6D1	GP2L-102	6TM-D1	Voltage Divider
C78	330	500	RCM20B331K	1469-00035					Horiz. Feedback
C79	470	500	RCM20B471K	1469-0005		5R5T5		MS-35	Voltage Divider
C80	.005	400	RCP10W4502M	P688-005	D6-502	PTE6D5	GP2-333-502	6TM-D5	Horiz. Sync. Coupling
C81	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		4TM-S5	AFC Filter
C82	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	AFC Filter
C83	.47	500	RCM20B474K	1469-00005		5R5Q5		MS-45	Voltage Divider †
C84	3900	500	RCM30C392K	1464-004		1DR5D4			Fixed Trimmer
C85	.1	600	RCP10W4104M	P688-1	DF-104	PTE6P1		6TM-P1	RF Bypass
C86	120	500	RCM20B121K	1469-00015		5R5T15			Horiz. MV Feedback †
C87	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	Horiz. Hold Cont. Shunt *
C88	.1	600	RCP10W6104M	P688-1	DF-104	PTE6P1		6TM-P1	Horiz. MV Decoupling
C89	820	500	RCM20C821K						Horiz. Discharge
C90	.01	600	RCP10M6103M	P688-01	D6-103	PTE6S1	GP2-333-103	6TM-S1	Horiz. Sweep Coupling
C91	.1	600	RCP10M6104M	P688-1	DF-104	PTE6P1		6TM-P1	Horiz. Output Screen
C92	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		4TM-P1	Horiz. Output Cathode
C93	.25	400	RCP10W4254M	P488 25		GT4P25		4TM-P25	Horiz. Sweep Coupling
C94	.06	600	RCP10M6603M	684-06				6TM-S5	Damper Filter
C95	.06	600	RCP10M6603M	684-06				6TM-S5	Damper Filter
C96	500	20000	V-9901-2	HV20C	TV3-502				HV Filter
C97	5000		V-5596	BPD-005	DD-502	1D5D5	811-005	5HK-D5	RF Bypass
C98	.01	400	V-5040-15	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Line Filter
C99	.01	400	V-5040-15	P488-01	D6-103	PTE4S1	GP2-333-103	4TM-S1	Line Filter
C100	.5				TCZ-.5		NP0K-R50		Fixed Trimmer
C101	.47	500	RCM20B470K	1468-00005	D6-470	5W5Q5	GP1K-470	1FM-45	Fixed Trimmer

* Not used in all models.
† Some models use 120MMF. in this application. (Part # RCM20B121K)
‡ Some models use 180MMF. in this application. (Part # RCM21E181J)
♦ Items C70A, C70B, C70C, R72A, R72B, R72C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1500Ω	2	V-9877		SBBT-565-S		Contrast Control Panel
B	500KΩ	2					Volume Control and Switch Tapped at 50KΩ-Rear
R2A	5000Ω	½	V-6463	QII-114	AG-19-S	AN-10	Vertical Linearity Control
B	Shaft		Not req.	Not req.	RS-2	AK-4	Attach to R2A per instructions
R3A	500KΩ	½	V-9894-1	QII-133	AG-58-S	AN-59	Vertical Hold Control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R3A per instructions
R4A	250KΩ	½	V-9813-4	QII-130	AG-55-S	B-50	Height Control
B	Shaft		Not req.	Not req.	RS-2	AK-1	Attach to R4A per instructions
R5A	125KΩ	½	V-10509-1		AG-49-S		Horiz. Hold Control
B	Shaft		Not req.		FS-3		Attach to R5A per instructions
R6A	50KΩ	½	V-9916-1	QII-123	AG-44-S	AN-31	Brightness Control
B	Shaft		Not req.	Not req.	FKS-1/4	AK-1	Attach to R6A per instructions
R7	1Meg	½	V-10130-3				Tone Control - See Note

Note: Not used in all models.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTINGHOUSE PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ± 10% UNLESS OTHERWISE SPECIFIED
R8	4700Ω	½		BTS-4700	RF Amp. Grid
R9	4700Ω	½		BTS-4700	RF Amp. Decoupling
R10	6800Ω	5% 1			Mixer Grid
R11	220KΩ	20% 1		BTS-220K	Mixer Grid
R12	470Ω			BTS-470	Decoupling
R13	47Ω				1st. Video IF Coil Shunt
R14	15KΩ			BTS-15K	Osc. Grid
R15	4700Ω			BTS-4700	Osc. Plate
R16	150Ω		RC20AE151K	BTS-150	Decoupling
R17	1Meg		RC20AE105K	BTS-1Meg	AGC Network - See Note 1
R18	10KΩ	20% ½	RC20AE103K	BTS-10K	1st. Video IF Amp. Grid
R19	220KΩ	20% ½	RC20AE224K	BTS-220K	AGC Network - See Note 1
R20	100KΩ		RC20AE104K	BTS-100K	AGC Network
R21	10KΩ	20% ½	RC20AE103K	BTS-10K	AGC Network
R22	47Ω		RC20AE470K		1st. Video IF Amp. Cathode
R23	2700Ω		RC20AE272K	BTS-2700	1st. Video IF Amp. Decoupling
R24	4700Ω	5% ½	V-9927-2	BTS-4700-5%	2nd. Video IF Transformer Shunt
R25	47Ω		RC20AE470K		2nd. Video IF Amp. Cathode
R26	470Ω	20% ½	RC20AE471K	BTS-470	Decoupling
R27	3000Ω	5% ½	V-9927-5		3rd. Video IF Transformer Shunt
R28	150Ω		RC20AE151K	BTS-150	3rd. Video IF Amp. Cathode
R29	470Ω	20% ½	RC20AE471K	BTS-470	3rd. Video IF Amp. Decoupling
R30	15KΩ	½	RC20AE153K	BTS-15K	4th. Video IF Transformer Shunt
R31	8200Ω	5% ½	V-9927-4	BTS-8200-5%	Video Detector Diode Load
R32	2200Ω		RC20AE222K	BTS-2200	Video Detector Diode Load
R33	1Meg	20% ½	RC20AE105K	BTS-1Meg	Noise Clipper Diode Load
R34	18KΩ	½	RC20AE183K	BTS-18K	Isolation
R35	220KΩ	½	RC20AE224K	BTS-220K	Voltage Divider
R36	68KΩ	½	RC20AE683K	BTS-68K	Peaking Coil Shunt
R37	68KΩ	1	RC30AE683K	BTA-68K	Video Amp. Screen
R38	4700Ω	1	RC30AE472K	BTA-4700	Video Amp. Plate
R39	4700Ω	1	RC30AE472K	BTA-4700	Video Amp. Plate
R40	2200Ω	½	RC20AE222K	BTS-2200	AGC Network
R41	10KΩ	2	RC40AE103K	BTB-10K	Keyed AGC Cathode

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTINGHOUSE PART No.	IRC PART No.	IDENTIFICATION CODES
R42	4700Ω	½	RC20AE472K	BTS-4700	Keyed AGC Grid
R43	3300Ω	1	RC30AE332K	BTA-3300	Voltage Divider
R44	100KΩ	½	RC20AE104K	BTS-100K	Isolation
R45	100KΩ	½	RC20AE104K	BTS-100K	Picture Tube Grid
R46	470KΩ	½	RC20AE474K	BTS-470K	Picture Tube Cathode
R47	12KΩ	½	RC20AE123K	BTS-12K	Voltage Divider
R48	68KΩ	½	RC20AE683K	BTS-68K	Voltage Divider
R49	150Ω	½	RC20AE151K	BTS-150	1st. Sound IF Amp. Cathode
R50	1000Ω	20% ½	RC20AE102K	BTS-1000	1st. Sound IF Amp. Decoupling
R51	100KΩ	½	RC20AE104K	BTS-100K	2nd. Sound IF Amp Grid
R52	180Ω			BTS-180	2nd. Sound IF Amp. Cathode - See Note 2
R53	1000Ω	20% ½	RC20AE102K	BTS-1000	2nd. Sound IF Amp. Decoupling
R54	12KΩ	½	RC20AE123K	BTS-12K	Ratio Detector Diode Load
R55	27KΩ	½	RC20AE273K	BTS-27K	De-emphasis
R56	10KΩ	½	RC20AE103K	BTS-10K	Tone Compensation
R57	10Meg	½	RC20AE106K	BTS-10Meg	AF Amp. Grid
R58	4.7Meg	½	RC20AE475K	BTS-4.7Meg	Voltage Divider - See Note 1
R59	330KΩ	½	RC20AE334K	BTS-330K	AF Amp. Plate
R60	150Ω		RC20AE151K		Parasitic Suppressor - See Note 1
R61	470KΩ	½	RC20AE474K	BTS-470K	Output Grid
R62	150Ω	½	RC30AE151K	BTA-150	Output Cathode
R63	680Ω	5	V-6984-2		Output Decoupling - Wire Wound
R64	470KΩ	20% ½	RC20AE474K	BTS-470K	Feedback
R65	470KΩ	½	RC20AE474K	BTS-470K	Sync. Amp. Grid
R66	12KΩ	½	RC20AE123K	BTS-12K	Sync. Amp. Plate
R67	470KΩ	½	RC20AE474K	BTS-470K	Isolation
R68	1Meg	½	RC20AE105K	BTS-1Meg	Sync. Separator Grid
R69	150KΩ	½	RC20AE154K	BTS-150K	Sync. Separator Plate
R70	22KΩ	½	RC20AE223K	BTS-22K	Voltage Divider
R71	150Ω	5	RC20AE152K	BTS-1500	Voltage Divider
R72A	22KΩ			BTS-22K	Integrator Network ·
B	8200Ω		♦V-9213	BTS-8200	Integrator Network
C	8200Ω			BTS-8200	Integrator Network
R73	820Ω	½	RC20AE821K	BTS-820	Vertical MV Cathode
R74	100KΩ	½	RC30AE104K	BTA-100K	Vertical MV Plate
R75	270KΩ	½	RC20AF274K	BTS-270K	Vertical MV Grid - See Note 3
R76	470KΩ	½	RC20AE474K	BTS-470K	Vertical MV Plate - See Note 1
R77	4300Ω	5% ½	RC20AE432J	BTS-4300-5%	Vertical Retrace Blanking Network - See Note 1
R78	2.2Meg	½	RC20AE225K	BTS-2.2Meg	Vertical Output Grid
R79	470Ω	½	RC20AE471K	BTS-470	Vertical Output Cathode
R80	7500Ω	10	V-9800-3	1 3/4A-7500	Vertical Output Decoupling - Wire Wound
R81	15KΩ	5	V-6984-15	1 3/4A-15K	Decoupling - Wire Wound
R82	100KΩ	½	RC20AE104K	BTS-100K	Horiz. Phase Detector Grid
R83	100KΩ	½	RC20AE104K	BTS-100K	Horiz. Phase Detector Cathode
R84	47KΩ	½	RC20AE473K	BTS-47K	Horiz. Phase Detector Plate
R85	220KΩ	½	RC20AE224K	BTS-220K	Horiz. Feedback Network
R86	470KΩ	½	RC20AE474K	BTS-470K	Horizontal AFC Filter
R87	47KΩ	½	RC20AE473K	BTS-47K	Horiz. AFC Filter
R88	270KΩ	½	RC20AE274K	BTS-270K	Horiz. MV Grid - See Note 4
R89	1200Ω		RC20AE122K	BTS-1200	Horiz. MV Cathode
R90	270KΩ	½	RC20AE274K	BTS-270K	Horiz. MV Plate
R91	27KΩ	½	RC20AE273K	BTS-27K	Horiz. MV Plate
R92	12KΩ	½	RC20AE123K	BTS-12K	Horiz. Peaking
R93	22KΩ	½	RC20AE223K	BTS-22K	Ringing Coil Shunt
R94	56KΩ	5% 1	RC30AE563J	BTA-56K	Horiz. MV Plate Decoupling
R95	33KΩ	½	RC20AE333K	BTS-33K	Decoupling
R96	150Ω	½	RC20AE151K		Parasitic Suppressor
R97	470KΩ	½	RC20AE474K	BTS-470K	Horiz. Output Grid
R98	33Ω	1	RC30AE330K		Horiz. Output Cathode
R99	12KΩ	10	V-9800-11	1 3/4A-12K	Horiz. Output Screen - Wire Wound
R100	5600Ω	½	RC20AE562K	BTS-5600	Horiz. Linearity Coil Shunt
R101	330KΩ	1	V-9927-7		HV Filter
R102	330KΩ	1	V-9927-7		HV Filter
R103	100KΩ	½	RC20A104K	BTS-100K	Vertical MV Plate Decoupling
R104	220KΩ	20% 1	RC30A224M	BTA-220K	Line Isolation

♦ Items R72A, R72B, R72C, C70A, C70B, C70C are combined in one unit
Note 1 Not used in all models.
Note 2 Some models use 150Ω resistor in this application.
Note 3 Some models use 470KΩ resistor in this application.
Note 4 Some models use 150KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	650VCT	5VAC	6.3VAC	V-9958-2	P-6314 ①	P-3066	PH-200
	③1.82A	.225ADC	③ 3A	③ 3.5A				

① Add series resistor to reduce plate voltage.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	550Ω	13Ω	V-10214-1	A-8130	HVO-6		Horiz. Output Trans.
	Tap 290	Taps .45Ω and 8.7Ω	V-10213-1③				
		SEC. 2					
		0Ω					
T3	640Ω	8Ω	V-6981-3	A-8112 ②	A-3038	TSO-5	Vert. Output Trans
T4A	13Ω		V-10538-1	DY-8	MDF-70		Horiz. Deflection Coils
B	48Ω		V-10045-4 ③				Vert. Deflection Coils

② Drill new mounting holes.
③ Used only in model H-651K17.

PARTS LIST CONTINUED ON PAGE 15

WESTINGHOUSE MODELS H648T20, H649T17, H650T17, H651K17, H652K20
H655K17, H656K17, H657K17, H659T17, H662K20, H663T17, H664K17

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T5	1.9KΩ	3.4Ω	230Ω	.8Ω	V-10288-1	A-3825 ②	A-2928	RO-2 ②	② Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD	V. C. IMP.	WESTINGHOUSE PART No.	VIKING PART No.	QUAM PART No.	
SP1	PM	3.2Ω	V-10030-1 ④	525J4	52A1	④ Used in table models only.
	PM	3.4Ω	V-9770-1 ⑤	10J12	10A4A	⑤ Used in console models only.
	CONE DIA.	V. C. DIA.				
SP 2	5 1/4"	9/16"				
	10 1/8"	1"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.210A	40Ω	1.4 Henries	V-6471-2	C-2326 ②	C-2974 ②	TR-3300②	② Drill new mounting holes.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	WESTINGHOUSE PART No.	IRC PART No.	
L2	Ant. Coil	0Ω	0Ω			Part of Tuner Part # V-10750-1
L3	Ant. Coil	0Ω	0Ω			Part of Tuner Part # V-10750-1
L4	Fil. Choke	0Ω				Part of Tuner Part # V-10750-1
L5	RF Coil	0Ω				Part of Tuner Part # V-10750-1
L6	Mixer Grid Coil	0Ω				Part of Tuner Part # V-10750-1
L7	Osc. Coil	0Ω				Part of Tuner Part # V-10750-1
L8	Osc. Coil	0Ω				Part of Tuner Part # V-10750-1
L9	Conv. Plate Coil	0Ω				Part of Tuner Part # V-10750-1
L10	Fil. Choke	0Ω		V-4886-2		
L11	Fil. Choke	0Ω		V-4886-2		
V12	1st. Video IF	.1Ω		V-9881-2		
L13	Sound Trap	0Ω		V-10586-1		
L14	Fil. Choke	0Ω		V-4886-2		
L15	2nd. Video IF	.5Ω	.5Ω	V-9879		
L16	Adj. Sound Trap	0Ω		V-10771		
L17	3rd. Video IF	.5Ω	.5Ω	V-9879		
L18	Fil. Choke	2.6Ω		V-9099-4	CL-1	3.9 Microhenries
L19	4th. Video IF	.6Ω	.5Ω	V-9880		
L20	Decoupling Choke	1.3Ω		V-4886-1		
L21	Peaking	7Ω		V-9915-1		100 Microhenries
L22	Decoupling Choke	1.3Ω		V-4886-1		
L23	Peaking	9Ω		V-9915-2		350 Microhenries
L24	Peaking	18Ω		V-9915-3		500 Microhenries
L25	Decoupling Choke	1.3Ω		V-4886-1		
L26	1st. Sound IF	1.2Ω		V-9882-2		
L27	2nd. Sound IF	1.2Ω		V-9882-2		
L28	Ratio Det. Trans.	4.6Ω	1.4Ω	V-9884		Tap 1.6Ω
L29	Fil. Choke	0Ω		V-4886-2		
L30	Horiz. Osc.	61Ω		V-6764		
L31	Width Coil	.8Ω	90Ω	V-9902		
L32	Horiz. Lin.	19Ω		V-9960		
L33	Fil. Choke	2.2Ω		V-9099-5	CLA	2.7 Microhenries

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					WESTINGHOUSE PART No.		
M1	Bayonet	6-8	.15	Brown	(W) # 47		Type # 47
M2	Bayonet	6-8	.15	Brown	(W) # 47		Type # 47

MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
M3	RF Tuner	V-10750-1	
M4	Focus Magnet	V-10206-2	
M5	Ion Trap	V-9784-3	
A9	Trimmer	V-9876	(1.6-18MMF) Adj. Channel Sound Trap
	Knob	V-10445-1	Channel Selector (Models H-657K17, H-662K20, H656K17, H-648T20, H-649T17, H650T17, H-659T17, H655K17)
	Knob	V-9941-1	Channel Selector (Model H-663T17)
	Knob	V-10676-1	Channel Selector (Model H-664K17)
	Knob	V-9940-1	Fine Tuning (All Models)
	Knob	V-9938-1	Off/On Volume (All Models)
	Knob	V-9939-1	Contrast (All Models)
	Knob	V-6146-16	Horiz. Hold (All Models)